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(11) Publication number : 0 629 563 A1

(12)

EUROPEAN PATENT APPLICATION

(21) Application number : 94304228.3

(51) Int. Cl.⁵ : B65D 83/04, A61J 7/02

(22) Date of filing : 13.06.94

(30) Priority : 17.06.93 GB 9312494

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(43) Date of publication of application :
21.12.94 Bulletin 94/51

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(84) Designated Contracting States :
AT BE CH DE DK ES FR GB GR IE IT LI LU NL
PT SE

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(54) Devices for dispensing and counting articles.

(57) A device for dispensing articles comprises a container for articles, a housing for receiving the container comprising a storage region for articles, dispensing means operable to dispense an article from the storage region, operation of the dispensing means being arranged to move an article from a holding position to a dispensing position, means (50) responsive to operation of the dispensing means for counting the number of operations, the counting means (50) being operable only when an article is dispensed, and means for resisting removal of the container from the housing until all the articles have been dispensed.

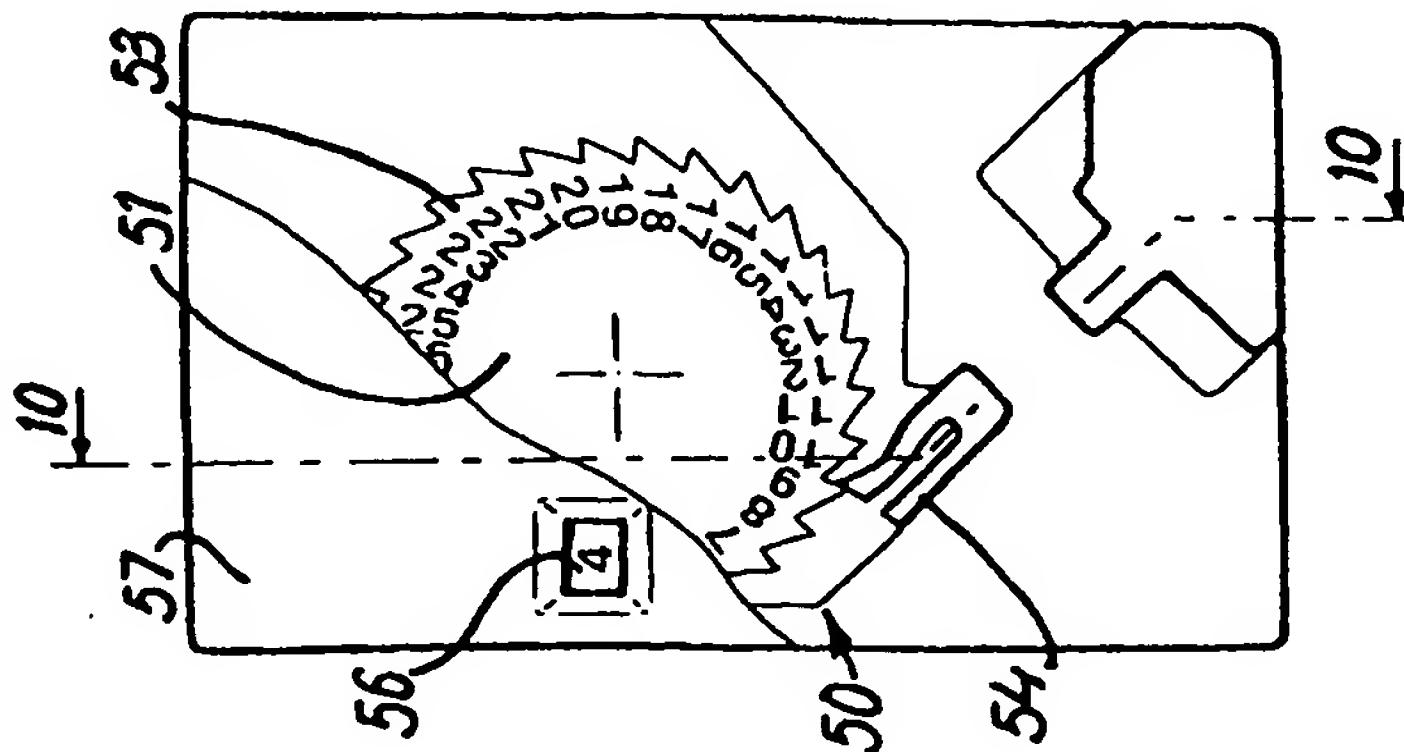


Fig. 5

EP 0 629 563 A1

This invention relates to devices for dispensing articles.

According to one aspect of the invention a device for dispensing articles comprises a store for articles, and dispensing means operable to dispense an article from the store, operation of the dispensing means being arranged to move an article from a holding position to a dispensing position.

5 The dispensing means may comprise first and second parts between which the article is received in the holding position, movement of the first and second parts moving the article to the dispensing position.

There may be a lost motion connection between the first and second parts so that dispensing movement of the first part only moves the second part when an article is in the holding position. There may be means for disturbing articles in the store. The disturbing means may be operated by the dispensing means.

10 There may be a connection between the disturbing means and the dispensing means arranged to operate the disturbing means on operation of the dispensing means to dispense an article and on movement of the dispensing means to a position to receive the next article to be dispensed. The connection may comprise a rack and a toothed wheel.

15 The store may comprise a storage region with an outlet passage leading to the holding position and arranged to receive articles in a desired orientation. The disturbing means may comprise rotary means having elements extending into the store. The rotary means may have elements extending into the store region adjacent an inlet to the outlet passage. The store region may comprise walls inclined towards the inlet, and the elements move in the store region adjacent the walls.

20 The device may have a housing having a periphery defining corners, and the dispensing means comprises an operating member at a corner. There may be security means movable between an operative position in which operation of the dispensing means is resisted to an operative position in which operation of the dispensing means is permitted.

25 There may be means for releasably holding the security means in the inoperative position. There may be means for releasably holding the security means in the operative position. The device may comprise a housing, the security means comprising a member movably supported in the housing and may be sized to be handheld.

30 According to another aspect of the invention a device for dispensing articles comprises a store for articles, means operable to dispense an article from the store, and means responsive to operation of the dispensing means for counting the number of operations, the counting means being operable only when an article is dispensed. Operation of the dispensing means may move an article from a holding position to a dispensing position.

35 The dispensing means may comprise first and second parts between which an article to be dispensed is received in the holding position, and a lost motion connection between the first and second parts so that the second part moves with the first part only when an article is received between the first and second parts, the counting means being responsive to movement of the second part.

40 According to another aspect of the invention a device for dispensing articles comprises a container for articles, a housing for receiving the container, means associated with the housing and operable to dispense an article, and means for resisting removal of the container from the housing until all the articles have been dispensed. There may be means for resisting comprising cooperable means of the housing and container responsive to receipt of the container by the housing. The cooperable means may comprise first and second formations on the container cooperable respectively with first and second formations in the housing, engagement of the first formations on receipt of the container moving the second housing formation to cooperate with the second container formation to resist removal of the container, operation of the dispensing means to dispense all the articles moving the second housing formation out of cooperation with the second container formation.

45 The first container formation may be movable between an operative position in which the first container formation can cooperate with the first housing formation and an inoperative position, the first container formation being moved to the inoperative position by said engagement of the first formations. The first container formation may be carried by bistable means so as to be movable between the operative and inoperative positions. There may be eject means operable to eject the container from the housing when the resisting means is rendered ineffective on dispensing of all the articles. The eject means may comprise spring means energised by receipt of the container by the housing.

55 According to a further aspect of the invention a device for dispensing articles comprises a container for articles, a housing for receiving the container, means associated with the housing and operable to dispense an article, the container having an outlet, a closure for the outlet, the housing and container having cooperable means which open the outlet on receipt of the container by the housing. The closure may be a flexible membrane connected to a member, which member on insertion of the container into the housing engages with the housing to draw the membrane from the outlet. The closure may be a flexible membrane, and the housing comprises means operable on insertion of the container into the housing to cut the membrane and to move the cut

membrane from the outlet. The cut membrane may be pushed into a recess in the container. The outlet may have four sides and the membrane extends beyond the sides of the outlet and the means cuts the membrane along and outside three sides and pushes the membrane along and outside the fourth side to move the cut membrane into the recess.

5 A device according to the invention may have one or more of these features.

The invention may be performed in various ways and one specific embodiment with possible modifications will now be described by way of example with reference to the accompanying somewhat schematic drawings, in which:

| | |
|---------------------|---|
| Fig. 1 | is a perspective view of a first embodiment of an article dispensing device; |
| 10 Figs. 2 to 4 | are part sections through this embodiment showing dispensing of an article; |
| Fig. 5 | is similar to Fig. 2 of a modification; |
| Fig. 6 | is a section on the line 6-6 of Fig. 5; |
| Fig. 7 | is a section showing an unjamming mechanism; |
| Fig. 8 | is a section on the line 8-8 of Fig. 7; |
| 15 Fig. 9 | is a section showing a counter mechanism; |
| Fig. 10 | is a section on the line 10-10 of Fig. 9; |
| Figs. 11 to 13 | are sections showing operation of an unjamming mechanism; |
| Figs. 14 A to C | show insertion of a hopper; |
| Fig. 15 | is a perspective view showing insertion of a hopper; |
| 20 Fig. 16 | is an enlarged view of part of Fig. 15; |
| Figs. 17, 18 | show interaction between hopper and counter mechanism; |
| Figs. 19 A to D | show another form of interaction between hopper and counter mechanism; |
| Figs. 20 A to D | show another form of interaction between hopper and counter mechanism; |
| Fig. 21 | is a perspective illustration of hopper and cutter; |
| 25 Figs. 22A to 22D | show operation of a foil cutter; |
| Fig. 23 | is a perspective view of a device with lock; and |
| Fig. 24A to C | show operation of the lock. |
| Fig. 25 | is a perspective view of a second embodiment. |
| Fig. 26 to 31D | are part sections showing the dispensing components of the second embodiment. |
| 30 Fig. 32 | is a section through line 32-32 of Fig. 31A. |
| Fig. 33 | is a part-section showing a counter mechanism. |
| Fig. 34 | is a section through line 34-34 of Fig. 33. |
| Fig. 35 to 37 | are sections showing operation of the unjamming mechanism. |
| Fig. 38A to D | shown details of the hopper-retention interaction between the hopper and counter wheel. |
| 35 Fig. 39 to 40 | show details of a trigger-lock. |

In general a dispensing device for articles is arranged for ease of use for example for the elderly, infirm or handicapped and is arranged on each operation to dispense a single article. A counter may be arranged to indicate the number of articles dispensed or not yet dispensed. A replaceable hopper can be used to load the 40 device. The device includes a store in which the articles are confined to a single plane, the store having an outlet passage shaped to receive articles in a desired orientation. When operated the article to be dispensed is moved from a holding or waiting position to a dispensing position.

In a first embodiment the device 30 for dispensing articles, for example pills, tablets or capsules or other solid medicaments, comprises a housing 31 including a dispensing mechanism 32 and a hopper 33 for use in 45 introducing into the device articles which are to be dispensed. As shown in Fig. 1, the device 30 is sized to be held in a hand. It includes a dispensing element 34 slidably mounted in the housing 31 and a zone 35 into which an article 36 is dispensed.

Inside the housing 31 is a storage region 37 which receives the hopper 33. A dispense outlet passage 38 leads from a lower end of the region 37 which, as seen in Fig. 2, is flanked by walls 39, 39a which are inclined 50 towards the passage 38. The region 37 has parallel walls 40, 41 spaced so as to confine the stored articles 36 to a single plane.

The dispensing element 34 includes an operating part 42 which in a datum position is located at a corner of the housing, Fig. 2. In this position the next article 36a to be dispensed is located in a gap 45 between two portions 43, 44 of the dispensing element 34 and in engagement with a part 46 of the housing 31. When the 55 user presses the operating part 42 against a suitable surface so as to move the element 34 slidably upwards in the housing (Figs 3, 4) the article 36a is moved laterally so that the article 36a can fall into the zone 35, during which movement a part 47 of the element 34 moves into a position closing the lower end of the passage 38 (Fig. 4). The element 34 includes an offset portion 48 at one side of the gap 45 and connecting the portions

43, 44.

The element 34 is biased to the datum position by a spring 120 (omitted from some figures) which when the element 34 is no longer pressed upwards urges the element back to the datum position and the article 36b at the lower end of passage 38 moves into the gap 45 so as to be ready for dispensing on the next operation of part 42.

It is desirable to include in the device 30 a counter or indicator mechanism 50 to provide an indication of how many articles have been dispensed from an initial number in the storage region 37 or how many remain in the region 37. For this purpose, a wheel 51 is mounted in the housing 31 for rotation on axis 52 and has numbered peripheral teeth 53 cooperable with an element 54 connected to portion 43 and slidably guided in the housing 31 so that on each upward movement of the part 42 the wheel 51 is turned one tooth. A window 56 in a wall 57 of the housing 31 displays either the number of articles dispensed or the number remaining in region 37. The number of teeth 53 corresponds to the number of articles initially in the region 37.

If the part 42 is operated when the region 37 is empty of articles, it is undesirable for the counter mechanism to be operated. A lost motion connection is therefore provided between portions 43, 44. The portion 48 is omitted and element 34 includes a recess 58 in which is slidable tongue 59 extending from portion 43 and including lip 59a. In the datum position the lip 59a is at the upper end of the recess 58 and if an article 36a is in the gap 45 dispensing occurs because the article 36a establishes a connection between portions 43, 44. If the gap 45 is empty then on upward movement of the part 42 and portion 44, the portion 43 does not move upwards.

One reason why gap 45 may be empty is if the articles 36 in the lower part of region 37 are bricked or jammed so as not to pass in succession into the passage 38; an example is shown in Fig. 12. An article displacing mechanism 60 is provided in the housing 31 and includes two wheels 61, 62 rotatably mounted in the housing 31. The wheels 61, 62 have cooperable toothed peripheral portions 61a, 62a. Wheel 62 has a coaxial toothed cog 63 which cooperates with a toothed rack 64 on an extension 65 of the part 42 which is slidably guided on housing 31.

The wheels 61, 62 carry a plurality of equiangularly spaced pegs 66, in the case shown three, extending parallel to the axis of rotation adjacent the wheel peripheries. On operation of part 42 the wheels 61, 62 are rotated in opposite senses and one or more pegs 66 are moved in the storage region 37 inwardly of surfaces 39, 39a to disturb the articles 36 (Fig. 13) and allow an article 36a to move into the gap 45. The rack 64 and cog 63 have a 1-way ratchet connection so that the cog 63 is turned only on upward movement of rack 64.

Other means for article disturbance could be provided.

The hopper 33 is pushed fully into the housing 31 so that after insertion the hopper 33 cannot readily be tampered with, and the hopper is constructed so that tampering before insertion can be detected. Thus the flat hopper has opposed walls 67, 68 which slidably engage housing walls 40, 41, a top wall 69 and side walls 70, 71. Wall 71 is inclined towards wall 70 at corner part 71a so as to direct the articles towards an outlet 72. The outlet 72, before the hopper is inserted into the housing 31, is closed by a peel-off tape 73 which extends partway along wall 70 and is attached to a boss 74. When the hopper is pushed into the top end of the housing 31, the boss 74 locates in a recess 75 adjacent the housing top end and further movement of the hopper causes the tape 73 to peel away from the outlet 72, see Figs. 14 A-C, allowing articles to move from the hopper into the lower end of region 37, the hopper occupying the upper end.

Preferably the inner face 40a of housing wall 40 has a keyway 77 cooperable with a boss 78 on wall 70. If the boss 78 is not in the correct position the hopper cannot be inserted into the housing. Also, the hopper 31 may have a manually depressable tongue 79 which when pressed can enter a keyway 80 in the inner face 40a. Means are provided to eject or part eject the hopper 33 from the housing 31 when all the articles have been dispensed. As mentioned, the number of teeth on the counter mechanism wheel 51 would correspond to the number of articles in the hopper before insertion into the housing. The boss 78 on insertion of the hopper passes through a gap 81 Fig. 17 in a ring 82 attached to the counter wheel 51. A plunger 83 carried on movable arms 84 engages a boss 85 on the ring 82 and the ring rotates to a position Fig. 18 to block upward movement of the hopper which thus cannot be removed until the complement of articles has been dispensed and the gap 81 Fig. 17 is again above the boss 78. Each arm 84 has a flexible part 84a and can rotate at an end in support 84b and is constructed to operate as an over-centre mechanism with upper (Fig. 18) and lower (Figs. 16,17) stable positions. Insertion of the hopper moves arms 84 upwards to an upper of its bi-stable states under the engagement of parts 83,85.

A spring 86 engages between the hopper and the housing and is compressed by insertion of the hopper so that when the gap 81 is again above the boss 78 the spring 86 moves the empty hopper upwards, the boss 78 passing through the gap 81. A further hopper identification key 91 on an arm 84 may cooperate with keyway 92 in inner face 40a. Because the arms 84 are now in the upper bi-stable position, if the hopper were re-inserted into the housing the plunger 83 would not engage the boss 85 and the spring 86 would again eject the empty hopper.

In a modified arrangement, Figs. 19A-D, a structure 87 is attached to the hopper and includes U-shaped element 87a having arms 88, 89. Arm 88 can bend at junction 90 between arms 88, 89. When the hopper is inserted into the housing, arm 88 moves slightly towards arm 89 and they pass through gap 81 and arm 88 then moves away from arm 89 Fig. 19B so that the hopper cannot be removed because of engagement with the ring 82. As the ring is rotated step by step during use, a pip 93 closes arm 88 fully against arm 89 and they are held in this position by a catch 94 so that (Fig. 19D) when the gap 81 returns to the initial position the arms 88, 89 can pass through the gap 81 enabling the spring 86 to eject the hopper. If the hopper is re-inserted it will again be ejected. The arms 88, 89 form a structure with two stable positions (Fig. 19A, Fig. 19D).

In the arrangement of Figs. 20A-D the hopper 33 has an aperture 96 in which a projecting latch 98 can slide. When the hopper is inserted the latch 98 at one end of the aperture engages a shoulder 97 at one end of a cam surface 99 on the ring 82 to move the ring 82 to a hopper-retaining position (Fig. 20B). As the wheel 51 is rotated in use, the latch 98 engages the cam surface 99 and is moved to the other end of the aperture 96 when the device 30 is empty, at which stage the spring 86 ejects the hopper. If the empty hopper is reinserted the latch 98 does not engage shoulder 97 and the hopper is again ejected. The latch 98 thus has two operating positions at the ends of the aperture.

Figs. 21, 22A-D show another means for opening a hopper with its outlet face closed by a sealed metal foil 100. The outlet of the hopper is formed by walls 101 surrounded by a channel 102. Mounted in the housing is a generally rectangular device 103 open at its ends and having walls 104, 105, 106, 107. The upper edges of walls 104, 105, 106 are formed as cutters which cut the foil as the hopper is inserted.

The edge of wall 107 is convex and this pushes the foil which has been cut on three sides into one side of the channel (Fig. 22D). When the hopper has been inserted, the walls 104-107 are in the channel 102.

Preferably the device 30 is provided with a measure of resistance to undesired use, or child proofing.

As shown in Fig. 23, one side of the housing 31 is provided with a trigger-like portion 110 pivoted at one end 111 and gripped during use. A movable locking member 112 is slidably mounted to project through an aperture 113 in wall 40. The member 112 is provided with a tab 114 which prevents movement of the member 112 in the aperture 113. A latch shown schematically at 115 connects the trigger 110 and the part 42 so that if the trigger 110 is in the datum, unsqueezed condition the part 42 cannot be operated to dispense an article. If the tab 114 is removed by pulling off, the member 112 can move in the aperture 113. The trigger is provided with two spaced notches 116, 117.

With the tab 114 removed and the member 112 at the lower end of aperture 113, the trigger 110 can be squeezed to release the latch 115 and the part 42 can be operated Fig. 24A. The requirement to squeeze the trigger 110 provides a degree of child proofing.

If the trigger 110 is in the unsqueezed state and the member 112 is moved into notch 116 Fig. 24B, the part 42 cannot be operated. If the trigger is squeezed and the member 112 is moved into notch 117 to hold the trigger in squeezed condition Fig. 24C, the part 42 can be operated and the child proofing is removed; this would be for users who through age or infirmity are unable to, or unable reliably to, squeeze the trigger 110.

It will be noted that the operating part 42 is at a corner of the housing 31, so that the housing 31 can be rested on any side without operating the part 42.

The slidable parts are guided by walls in the housing some of which are omitted for clarity.

The zone 35 may have transparent walls so that a dispensed article can be seen, and have one or more apertures 35a Fig. 1 through which the dispensed article can be removed through an aperture 35A by manipulating the device 30, for example the article can fall onto a plate or pass direct into a user's mouth.

If desired the article rest zone 35 could be omitted and the article fall direct from the device 30.

The position of key and keyway 78, 77 is different for different hoppers so that each housing will cooperate only with hoppers with the correct key 78. Hoppers with different keys 78 are loaded with different articles 36. A user with a particular housing 31 can only receive articles appropriate to a housing having the relevant key 78.

There could be a spring to assist in dispensing the article 36a Fig. 4.

A second embodiment is illustrated in Figs. 25-40. Components having functions similar to those of the first embodiment retain the same label number.

A device 30 comprises a housing 31 including a dispensing mechanism 32 and a hopper 33 for use in introducing into the device articles which are to be dispensed. In this embodiment, the dispensing zone 35 is located within the dispensing element 34, which is slidably mounted in the housing 31.

Inside the housing 31 is a storage region 37 which receives the hopper 33, as in the first embodiment. A dispense outlet passage 38 leads from a lower end of the region 37 which, as seen in Fig. 26, is flanked by walls 39, 39a which are inclined towards the passage 38. The region 37 has parallel walls 40, 41 spaced so as to confine the stored articles 36 to a single plane.

The dispensing element 34 is located at the base of the housing, Fig. 26. When the user presses the device

downwardly on a surface this element retracts into the housing. A shuttle 123 located in a channel in one wall of the housing is moved to the position shown in Fig. 26 by shuttle driver 124, having a follower 125 which runs in a groove 126 in an upstanding wall 65 of element 34 (see Figs. 31A-D and 32). Article 36a drops into position in the gap 45 between shuttle 123 and a free shuttle 122, which is urged to its position in Fig. 26 by 5 a light spring (not shown). When the device is raised, element 34 is returned to its starting position by means of a spring (not shown).

The shuttle driver 124 returns shuttle 123 to its starting position (Fig. 28). If the article 36a has successfully fallen to its position in Fig. 27, the article is urged into contact with the free shuttle 122 and moved laterally to the delivery position in Fig. 28. A final slight retraction of shuttle 123 caused by the cranked top end of groove 10 126 allows the article to drop through the dispensing zone into the dispensing element 34, from which it can be tipped into the user's hand or mouth, or into another receptacle.

If article 36a became trapped in the position shown in Fig. 29B, then spring 120 would compress and prevent damage to the trapped article.

The counting mechanism in this embodiment is shown in Fig. 33. Element 54 has a hole 76 which engages 15 a peg on the back of free shuttle 122, this peg projecting through a slot in the housing wall. When the device is operated and an article 36a is successfully delivered, the element 54 is moved to the right (Fig. 33), and a ratchet arm on element 54 engages ratchet teeth 53 on counter wheel 51. Wheel axis 52 comprises a ratchet mechanism to prevent reversal of counter wheel 51 when the device is next operated and element 54 is moved 20 to the left. If no article 36 is dispensed, either because no article falls into place or because of jamming, then shuttle 122 does not move and the counter wheel is not advanced. The number of articles dispensed is viewed through a window 56 in housing 57.

The means to prevent breaking or jamming in this embodiment is shown in Figs. 35-37. The upstanding wall of element 34 terminates in two parallel racks 64 having ratchet teeth. These co-operate with toothed wheels 63 which extend through the wall of the housing to drive wheels 61, 62 having blades 66 which are 25 rotated in the directions indicated when the device is activated, displacing the articles in a generally upward direction. Reversal of rotation is prevented by fingers 67 (Fig. 35) provided in the housing wall. The blades are set in shallow wells in one wall of the housing, the geometry being such that it is impossible to trap an article between a blade and the side of the housing.

In this embodiment, retention of the hopper is effected as shown in Figs. 38A-D. When hopper 33 is inserted 30 into the housing boss 78 passes through gap 81. A bi-stably mounted peg 98 mounted within the formation 121 on the hopper engages shoulder 97 of the counter wheel 51 to rotate it so that boss 78 is trapped within ring 82. As counter wheel 51 is rotated in use, peg 98 is moved by cam surface 99 to its second stable position. The hopper is ejected by a spring when counter wheel 51 has completed its rotation and boss 78 is again aligned 35 with gap 81. On re-insertion of the hopper with peg 98 in this second position; no contact with shoulder 97 would occur, and counter wheel 51 would not be rotated into the position where boss 78 is trapped. The hopper would therefore be immediately ejected.

As in the first embodiment, the trigger device 110 (Fig. 39) must be depressed before the dispensing mechanism can be activated. In this embodiment, the locking mechanism comprises a slidable locking member 112 (Fig. 39) which can engage notch 116 to prevent activation and provide a degree of child-proofing (Fig. 40B). 40 For someone finding a gripping motion difficult, the trigger can alternatively be locked into its operating position by engaging member 112 with notch 117, as in Fig. 40C.

Claims

45

1. A device for dispensing articles comprising:
 - i) a container for articles,
 - ii) a housing for receiving the container comprising a storage region for articles,
 - iii) dispensing means operable to dispense an article from the storage region, operation of the dispensing means being arranged to move an article from a holding position to a dispensing position,
 - iv) means responsive to operation of the dispensing means for counting the number of operations, the counting means being operable only when an article is dispensed, and
 - v) means for resisting removal of the container from the housing until all the articles have been dispensed.
- 55 2. A device as claimed in Claim 1, in which the dispensing means comprises first and second-parts between which the article is received in the holding position, movement of the first and second parts moving the article to the dispensing position, and including a lost motion connection between the first and second

parts so that dispensing movement of the first part only moves the second part when an article is in the holding position.

3. A device as claimed in Claim 1, in which the storage region has an outlet passage leading to the holding position, the outlet passage being arranged to receive articles in a desired orientation.
5
4. A device as claimed in Claim 1, comprising means operated by operation of the dispensing means for disturbing articles in the storage region, the disturbing means comprises rotary means having elements extending into the storage region adjacent an inlet to the outlet passage.
10
5. A device as claimed in Claim 1, including security means movable between an inoperative position in which operation of the dispensing means is resisted to an operative position in which operation of the dispensing means is permitted.
15
6. A device as claimed in Claim 5, including means for releasably holding the security means in the inoperative position or in the operative position.
20
7. A device as claimed in Claim 1, in which the dispensing means comprises first and second parts between which an article to be dispensed is received in the holding position, and a lost motion connection between the first and second parts so that the second part moves with the first part only when an article is received between the first and second parts, the counting means being responsive to movement of the second part.
25
8. A device as claimed in Claim 1, in which the means for resisting removal comprises cooperable means of the housing and container responsive to receipt of the container by the housing, wherein first and second formations on the container cooperate respectively with first and second formations in the housing, engagement of the first formations on receipt of the container moving the second housing formation to cooperate with the second container formation to resist removal of the container, operation of the dispensing means to dispense all the articles moving the second housing formation out of cooperation with the second container formation.
30
9. A device as claimed in Claim 8, in which the first container formation is carried by bi-stable means so as to be movable between an operative position in which the first container formation can cooperate with the first housing formation and an inoperative position, the first container formation being moved to the inoperative position prior to removal of the container from the housing.
35
10. A device as claimed in Claim 8 comprising eject means operable to eject the container from the housing when the resisting means is rendered ineffective on dispensing of all the articles.
40
11. A device as claimed in Claim 8, in which the eject means comprises spring means energised by receipt of the container by the housing.
45
12. A device as claimed in Claim 1 wherein the container for articles has an outlet, a closure for the outlet, the housing and container having cooperable means which open the outlet on receipt of the container by the housing.
50
13. A device as claimed in Claim 12 in which the closure is a flexible membrane, and the housing comprises means operable on insertion of the container into the housing to cut the membrane and to move the cut membrane from the outlet, the cut membrane being pushed into a recess in the container.
55
14. A device as claimed in Claim 13, in which the outlet has four sides and the membrane extends beyond the sides of the outlet and the means cuts the membrane along and outside three sides and pushes the membrane along and outside the fourth side to move the cut membrane into the recess.

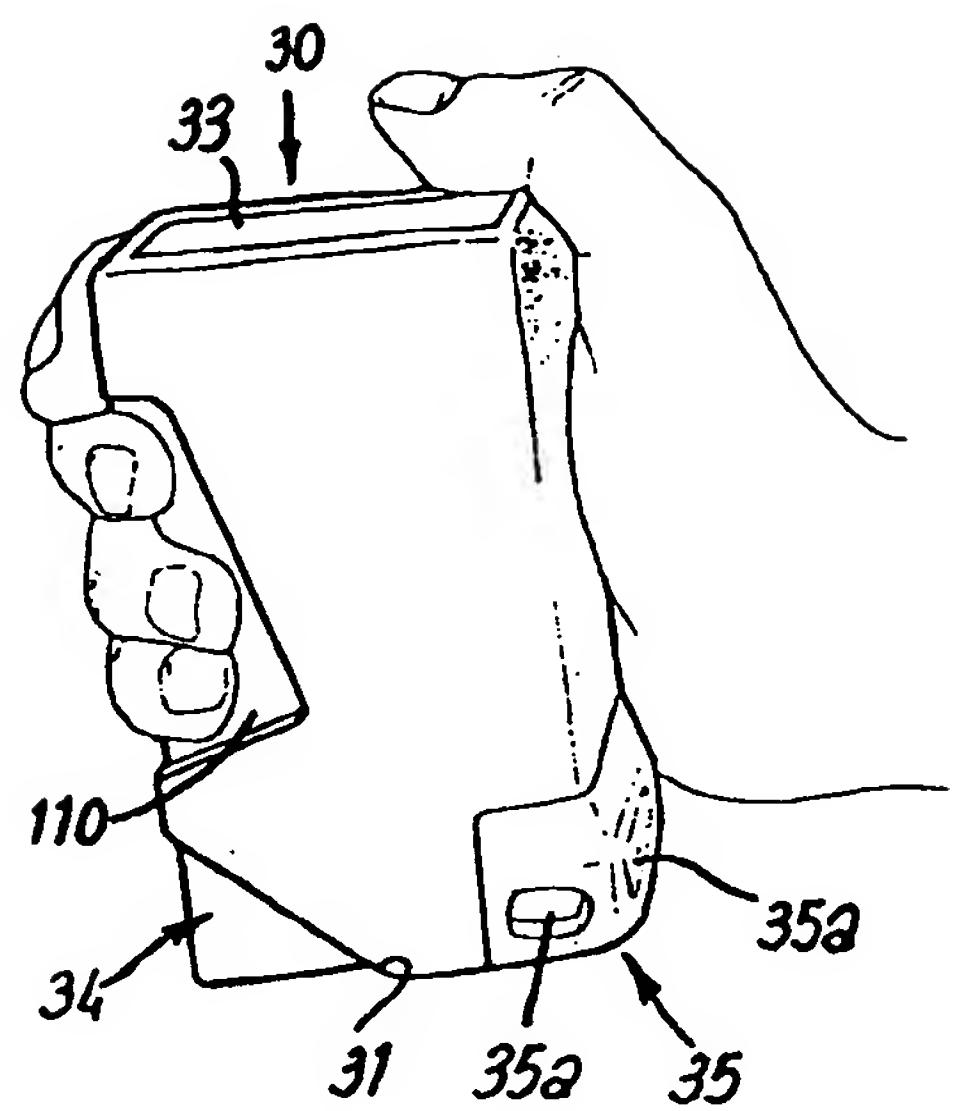


FIG. 1

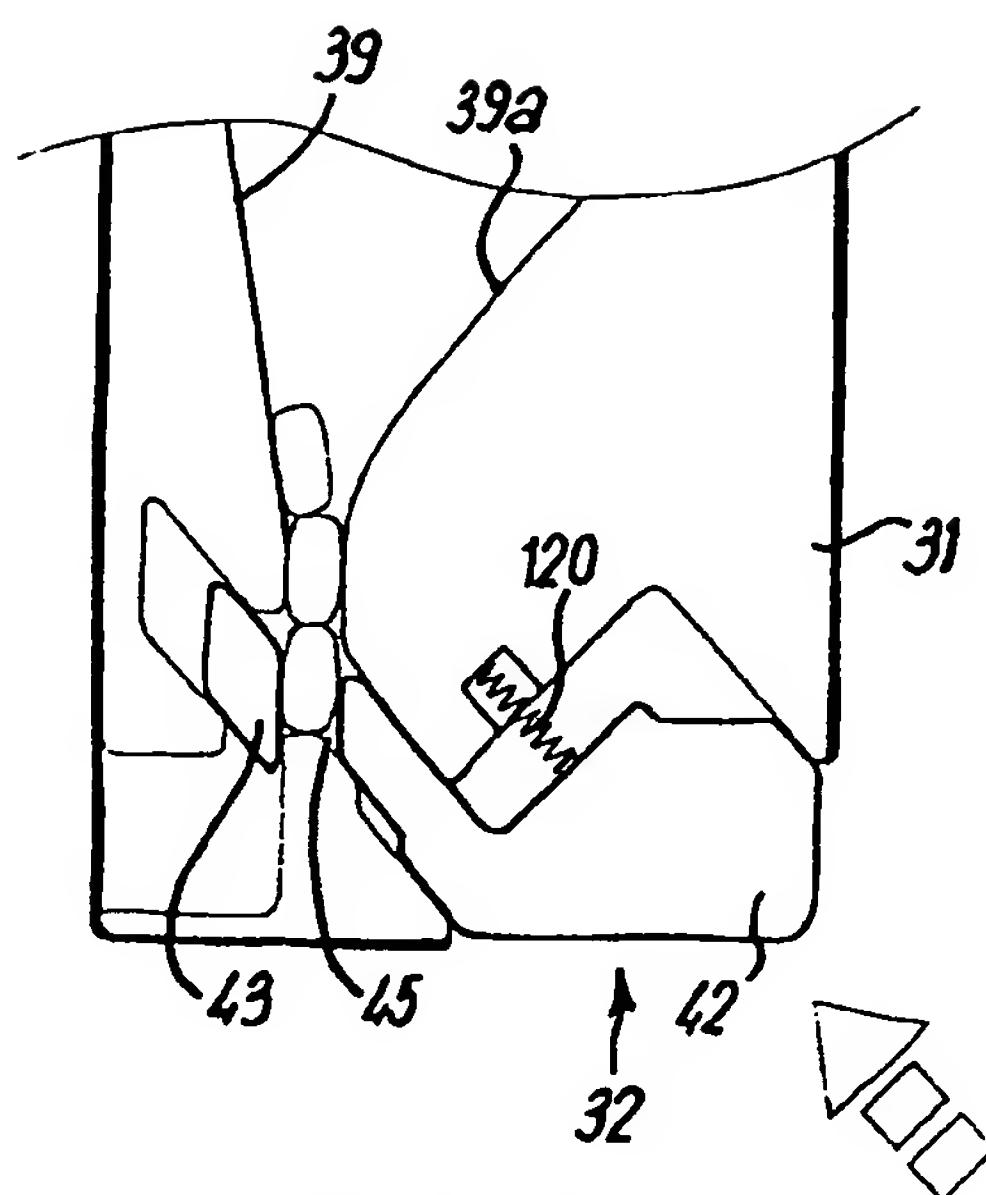


FIG. 2

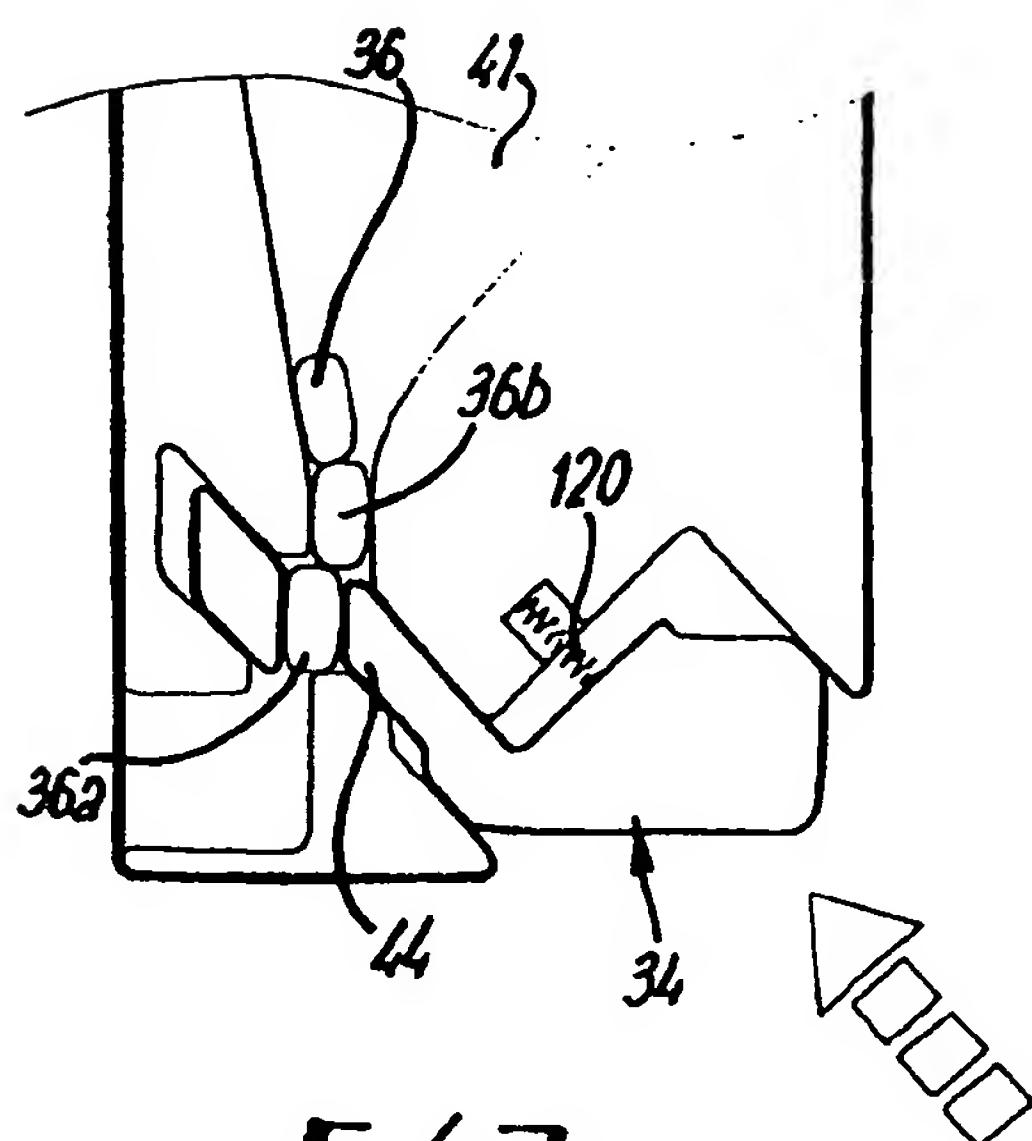


FIG. 3

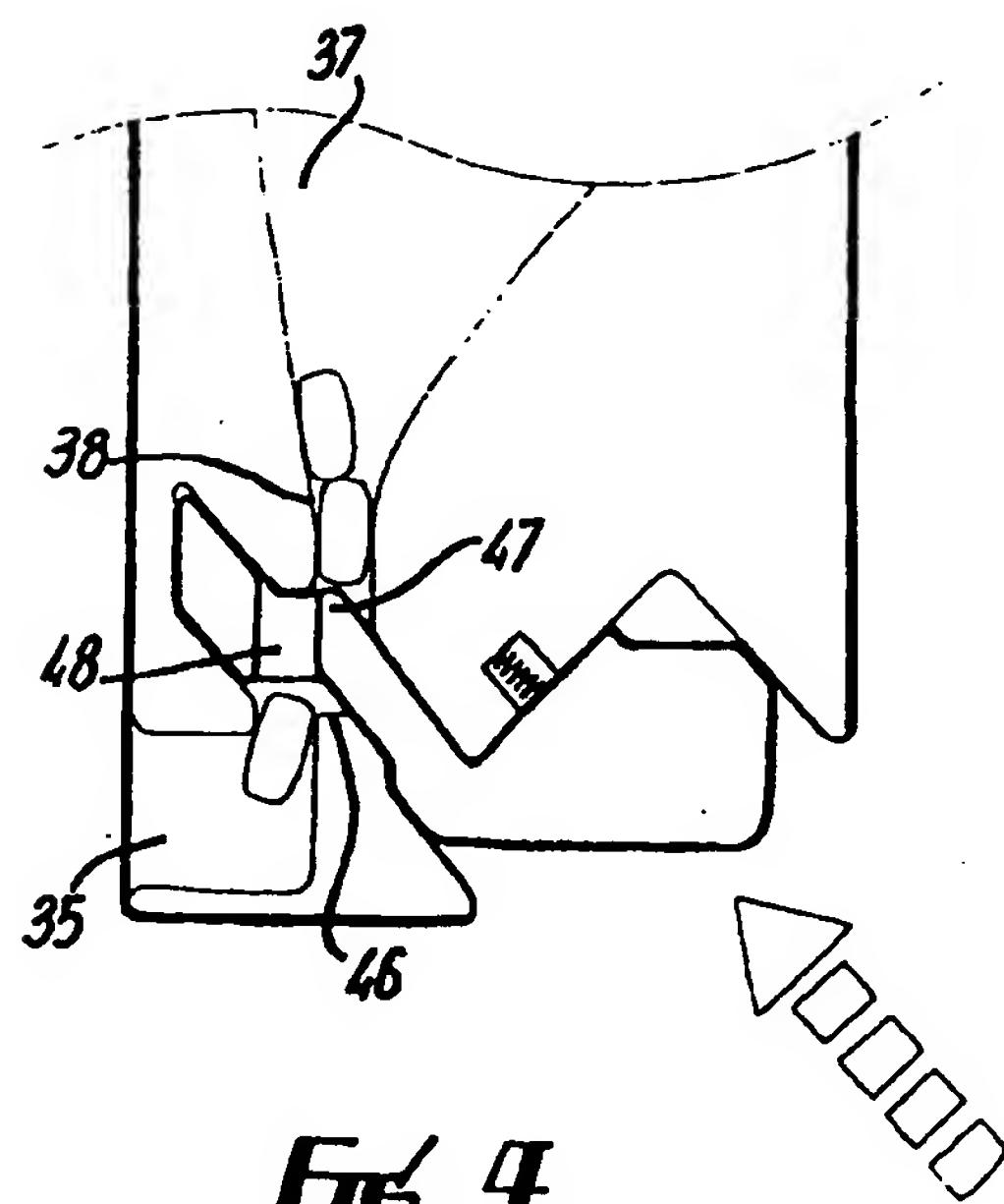
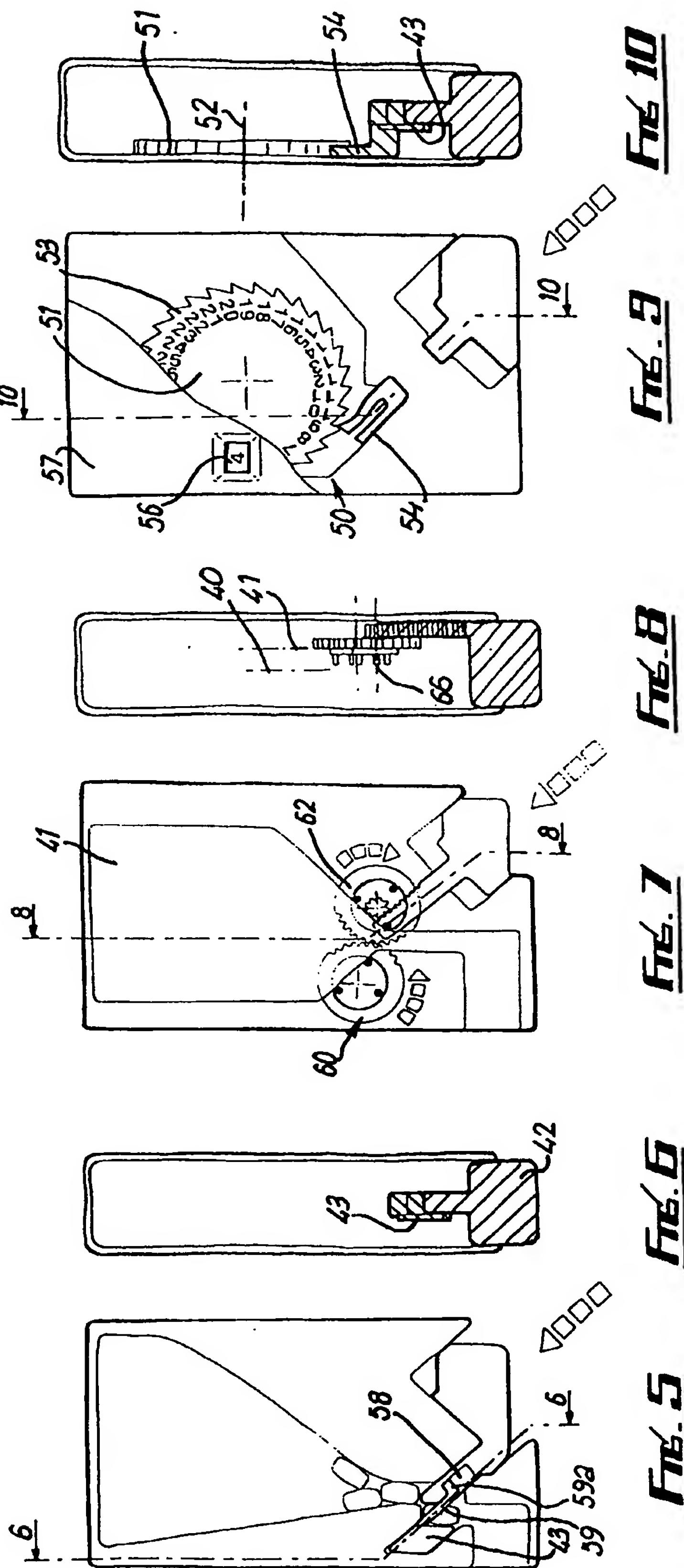


FIG. 4



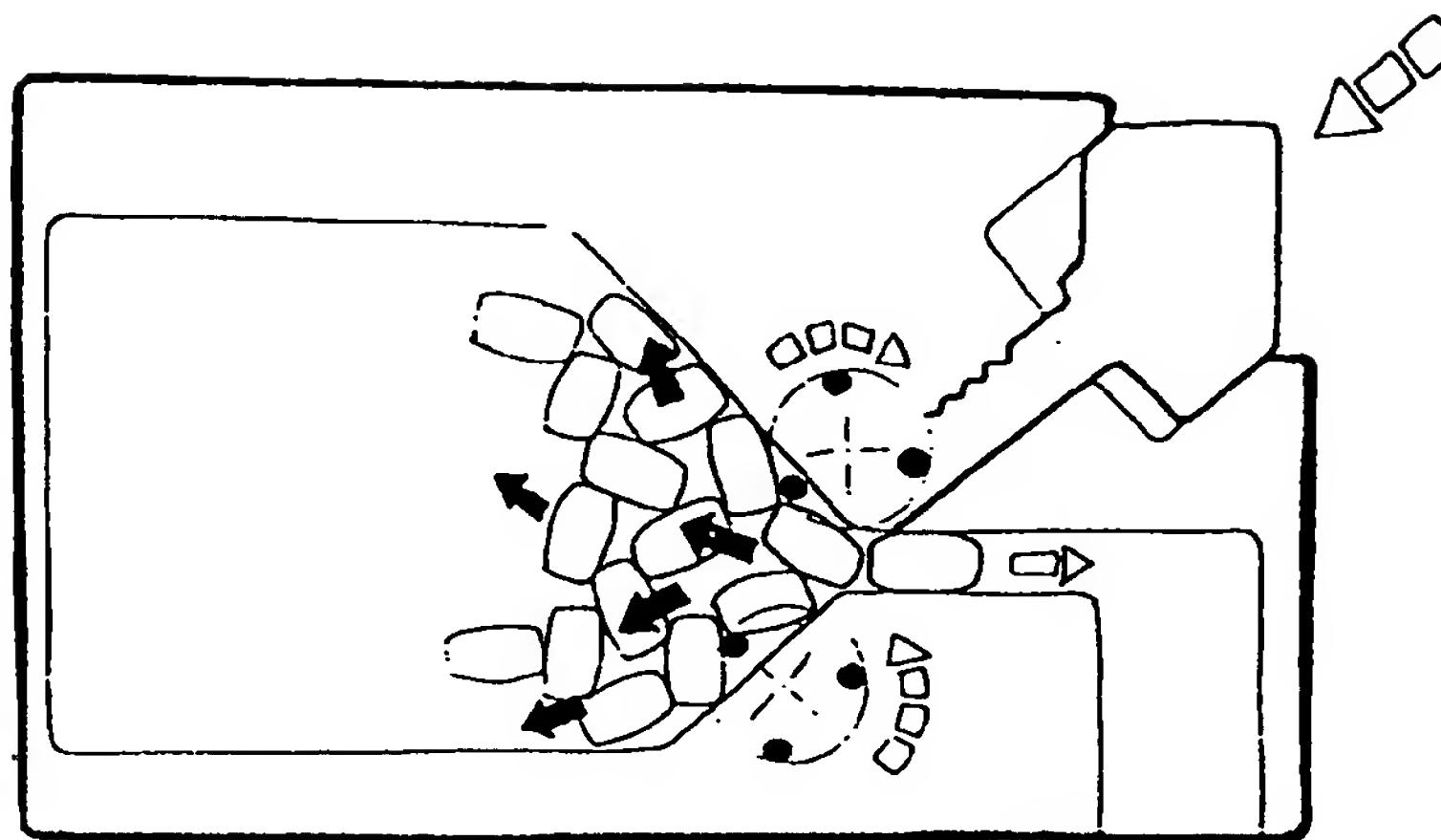


Fig. 13

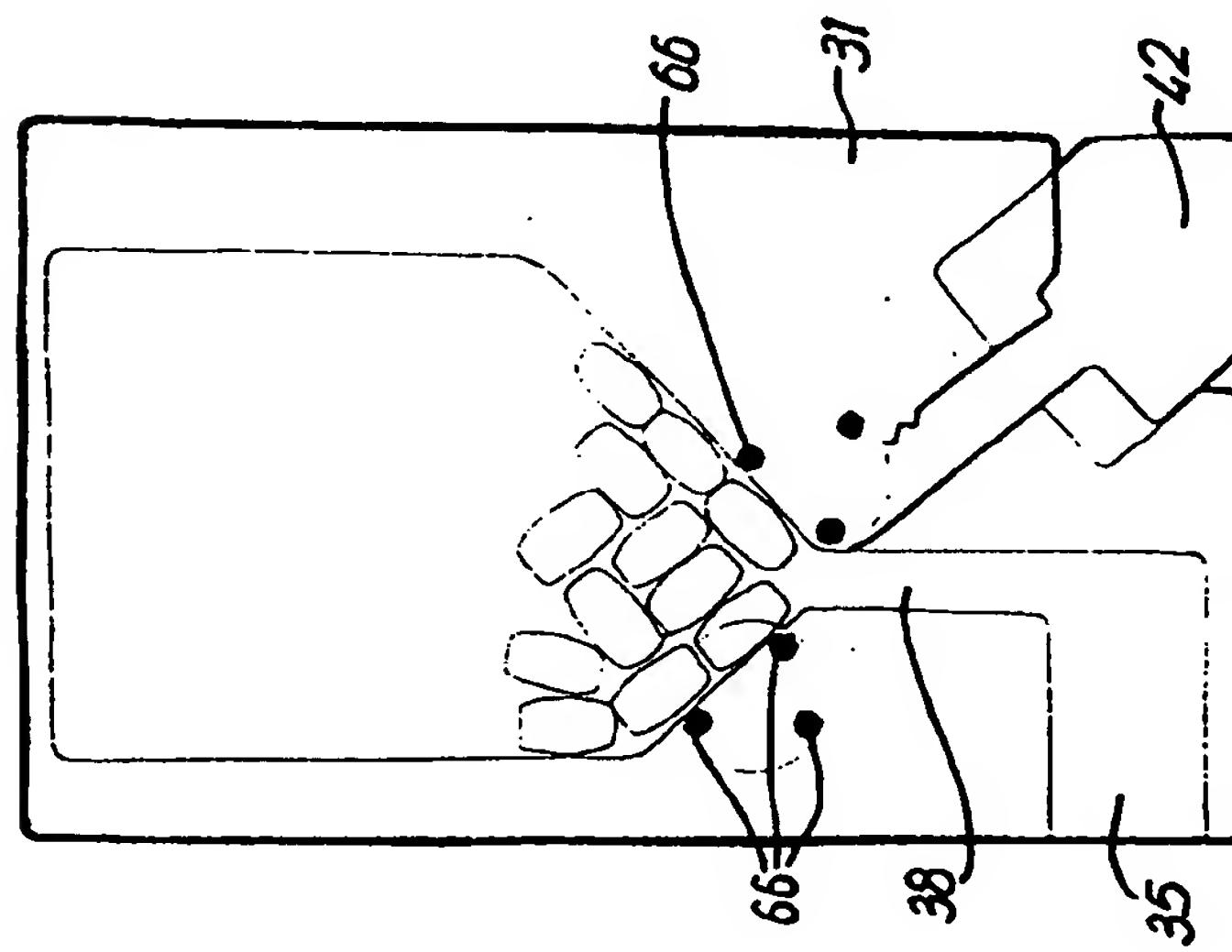


Fig. 12

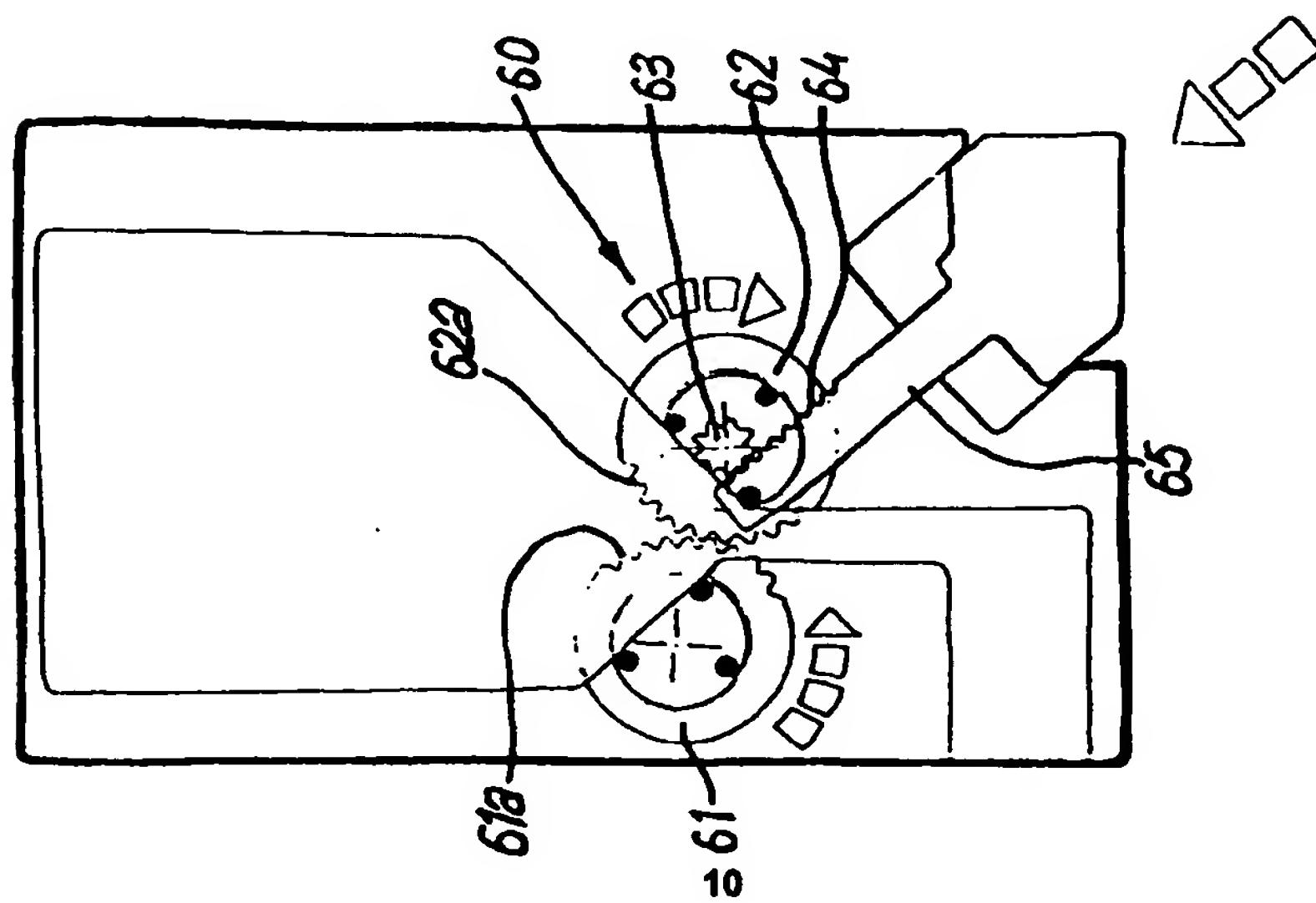


Fig. 11

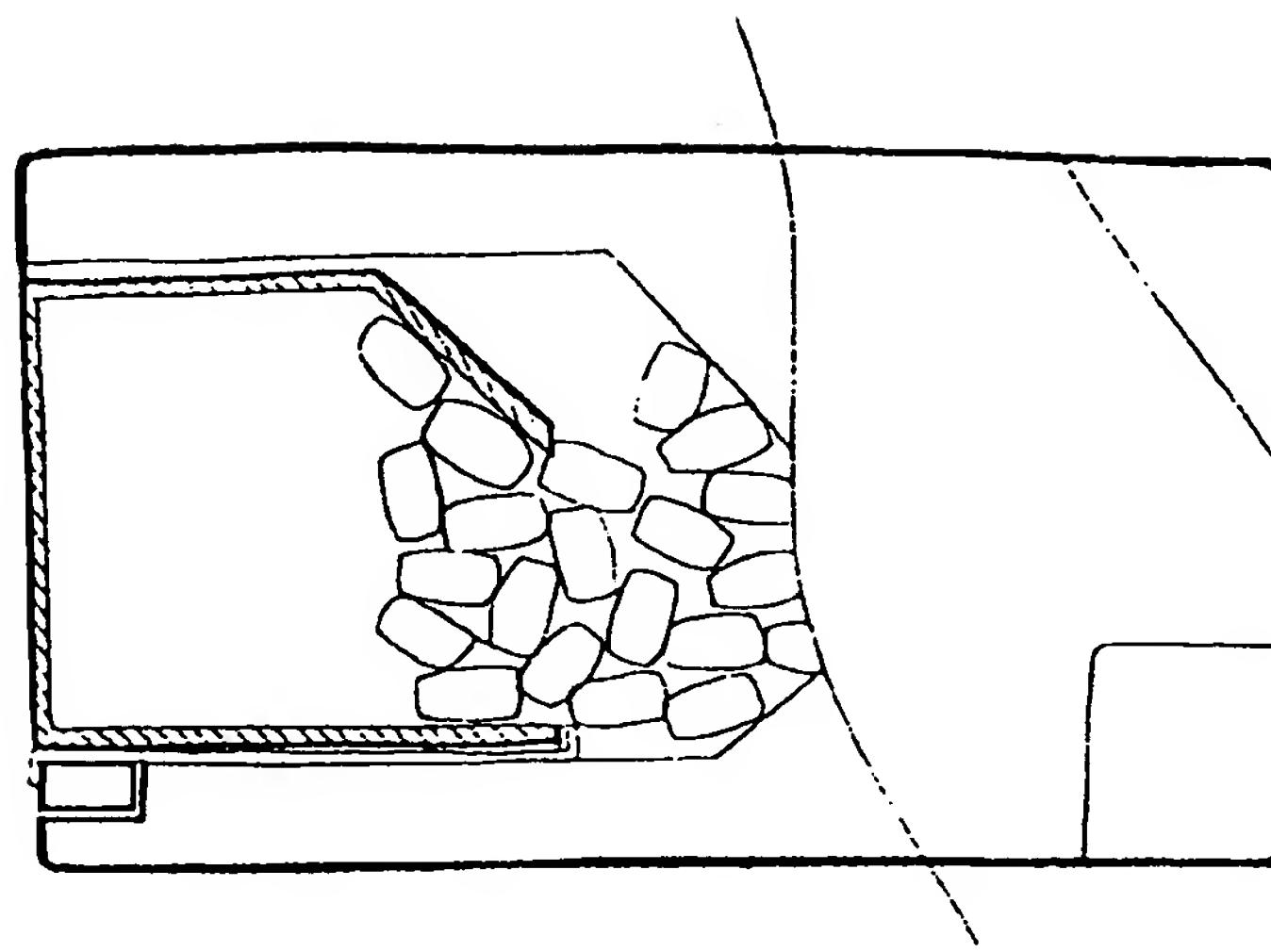


Fig. 14C

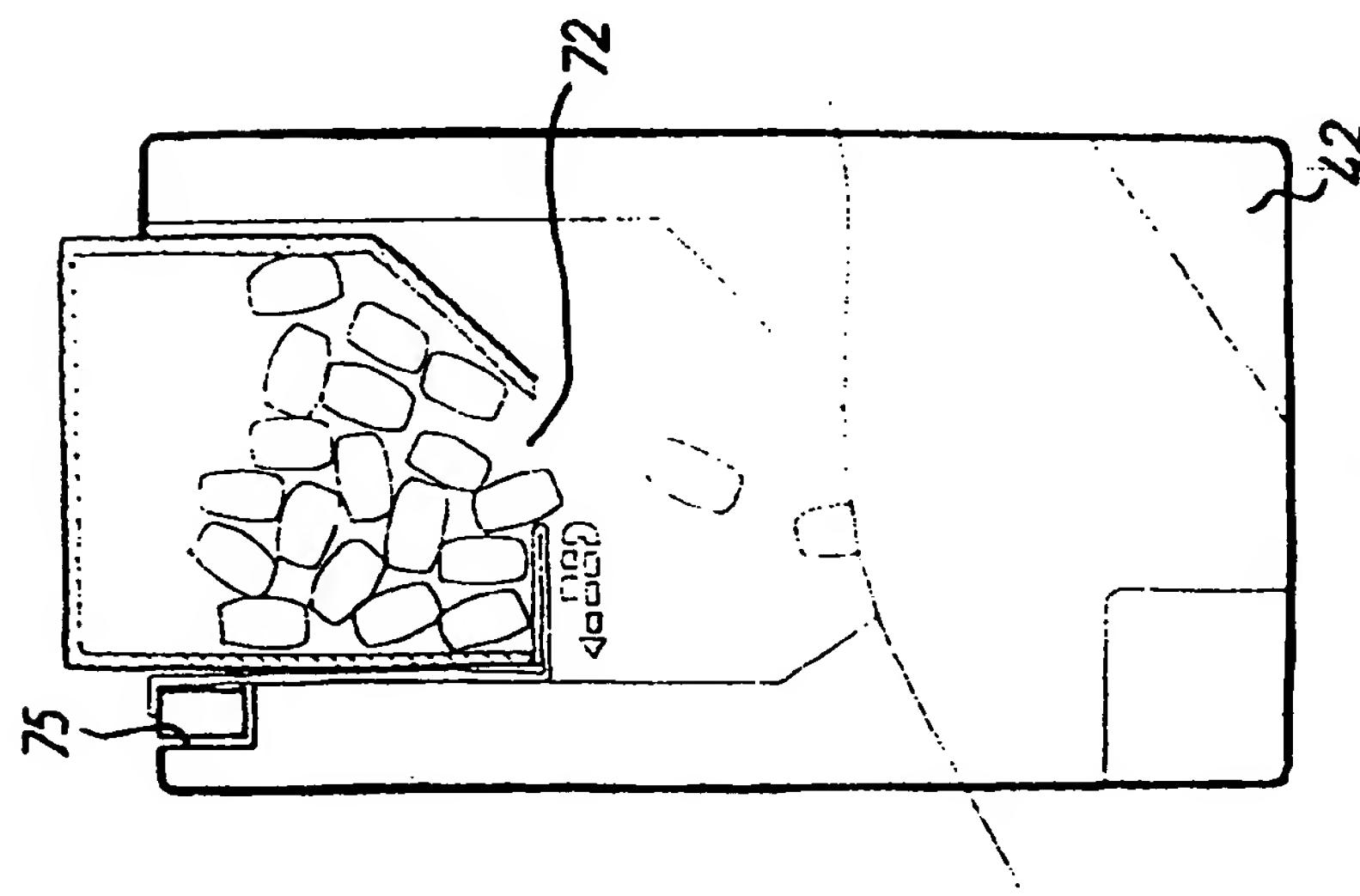


Fig. 14B

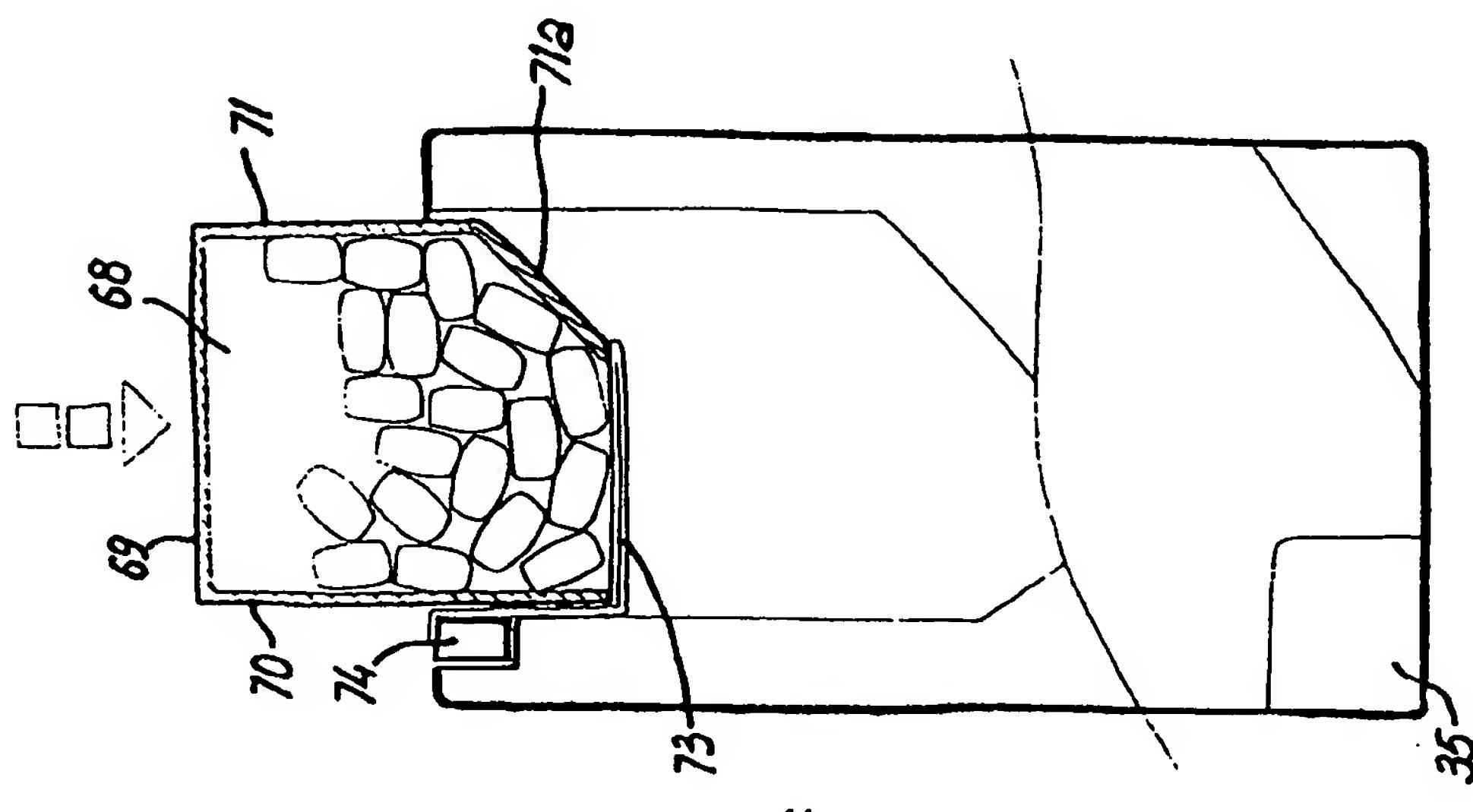


Fig. 14A

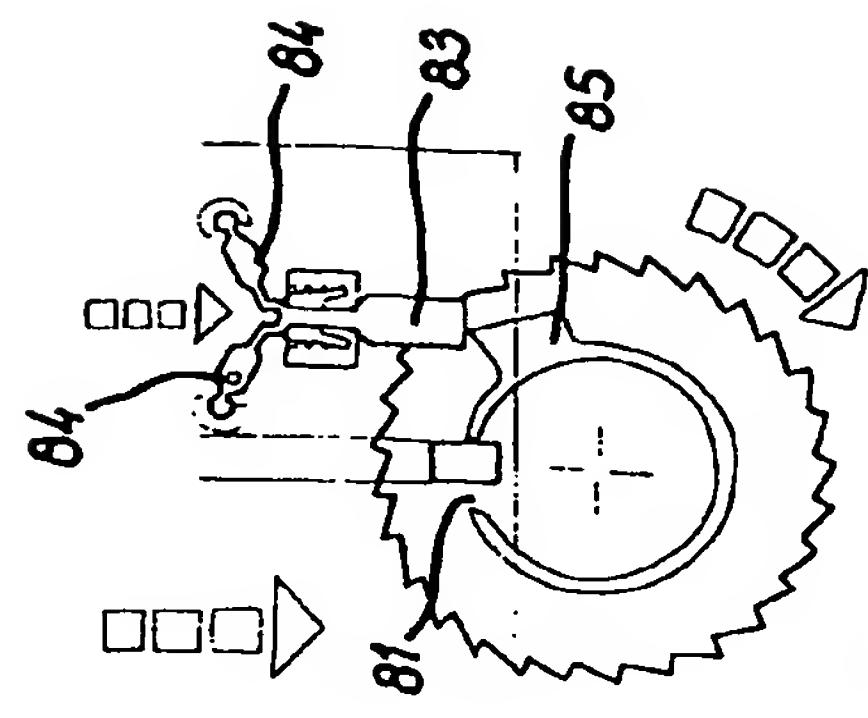


Fig. 17

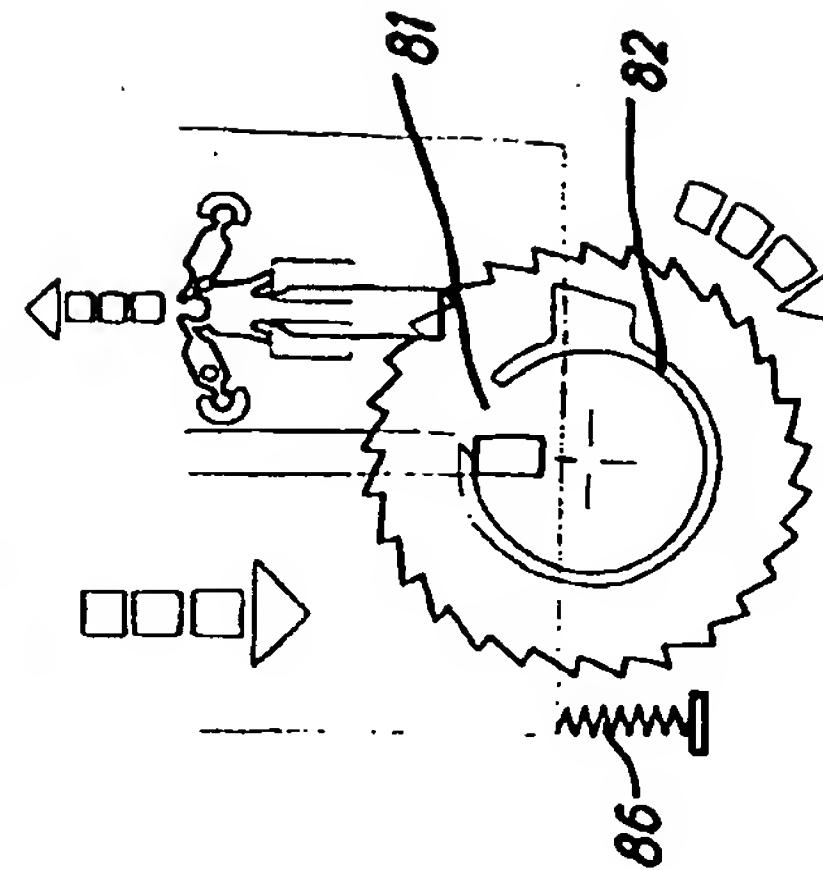


Fig. 18

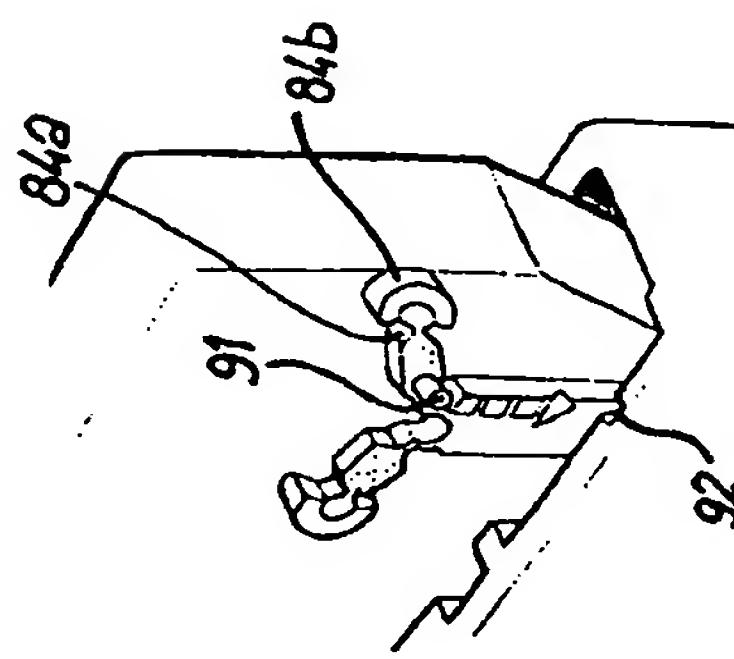


Fig. 16

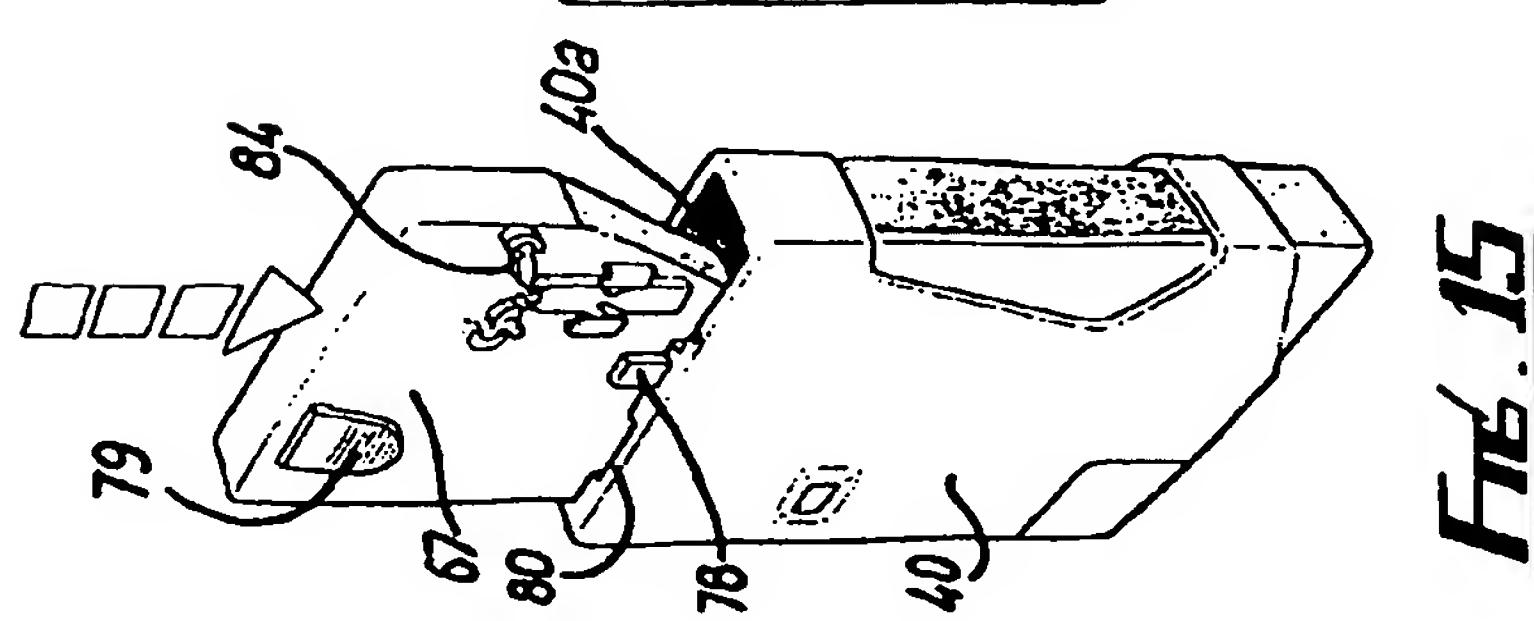
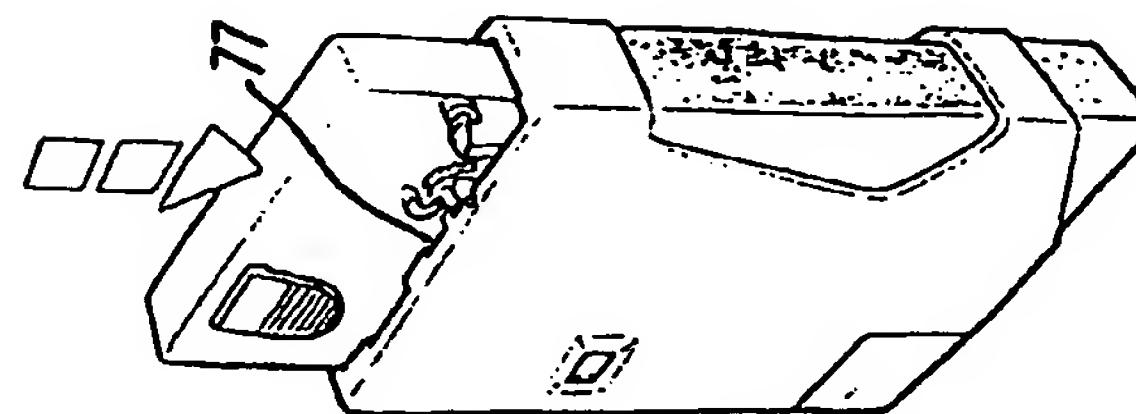


Fig. 15

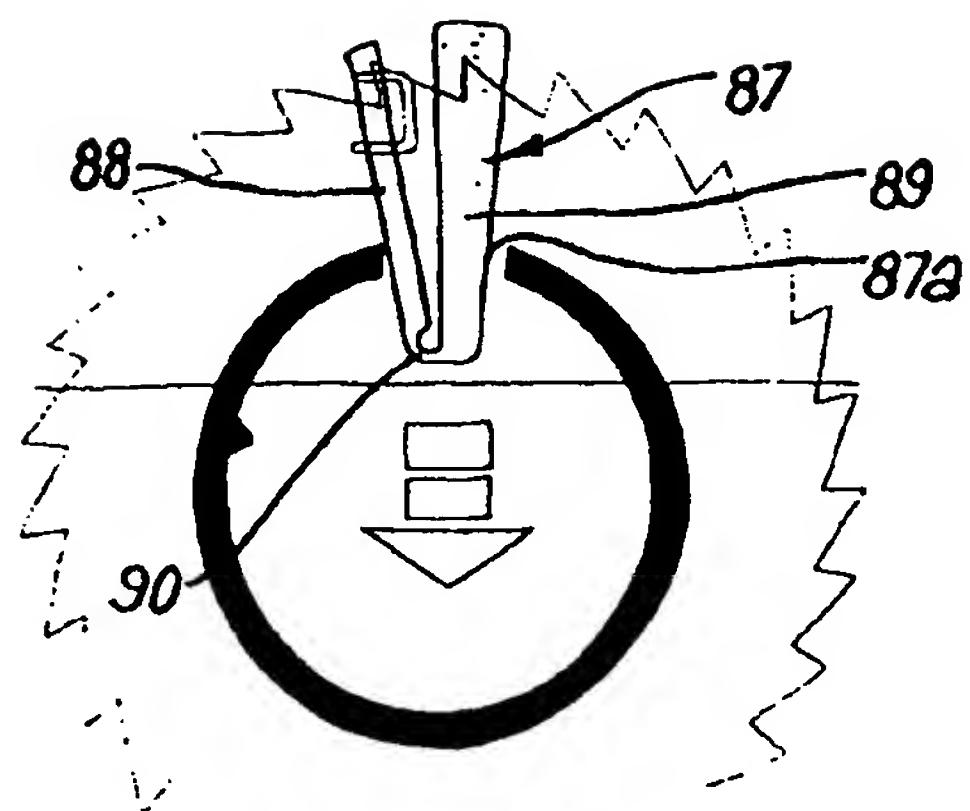


FIG. 19A

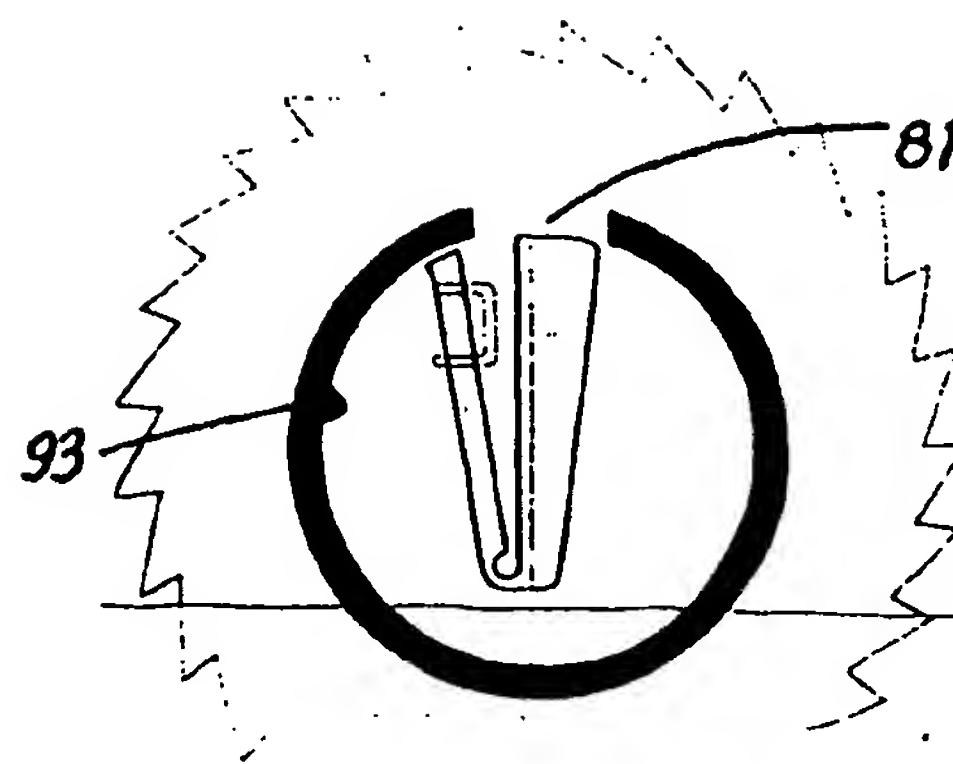


FIG. 19B

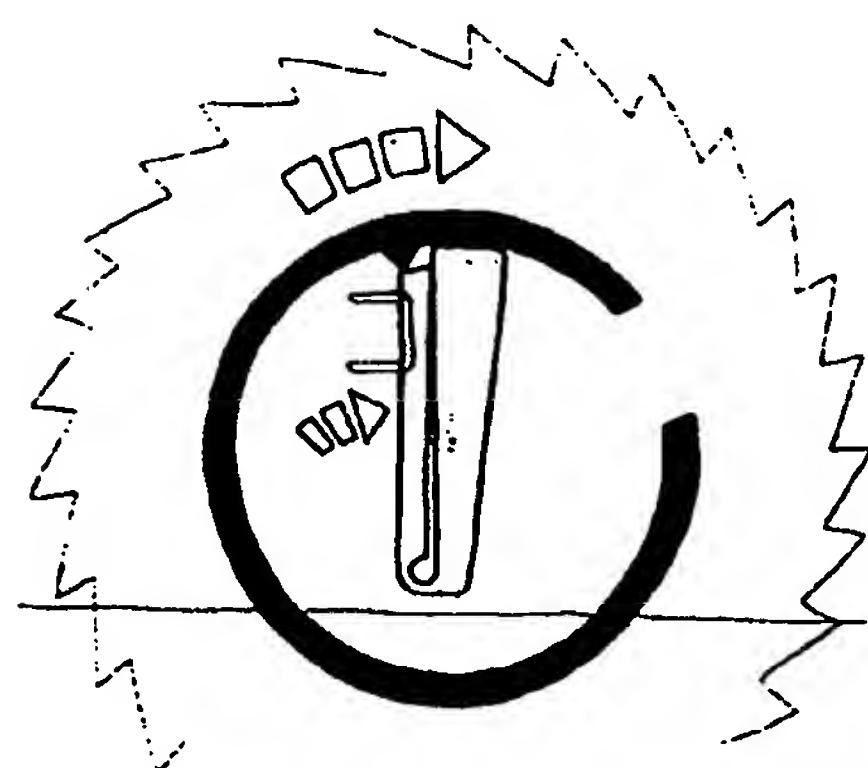


FIG. 19C

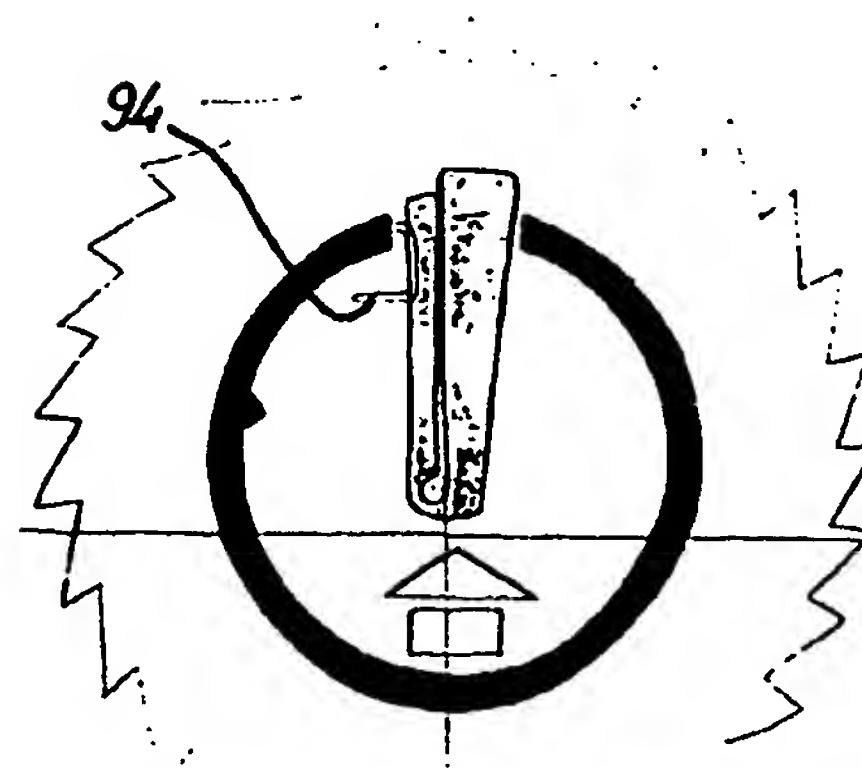


FIG. 19D

FIG. 20B

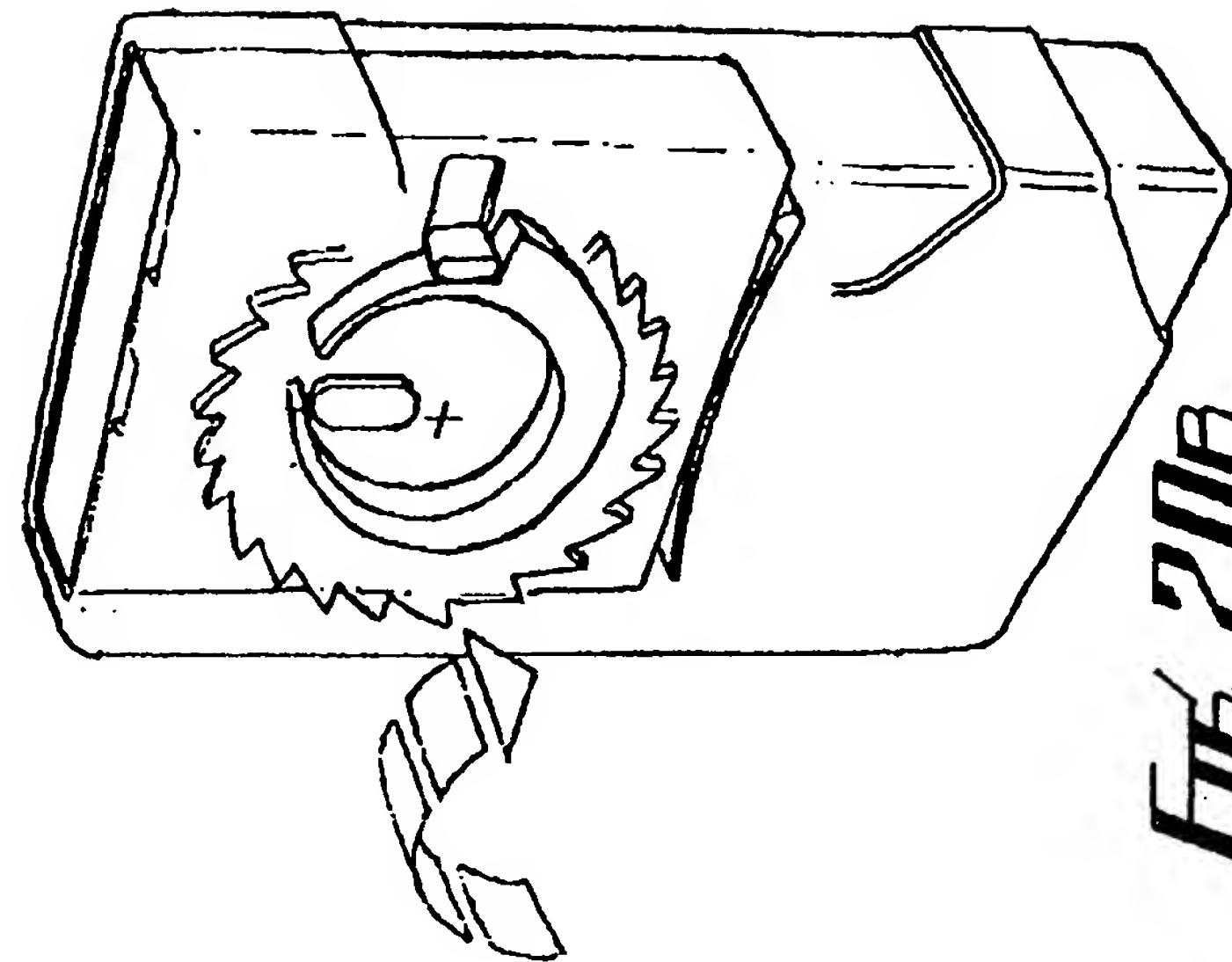
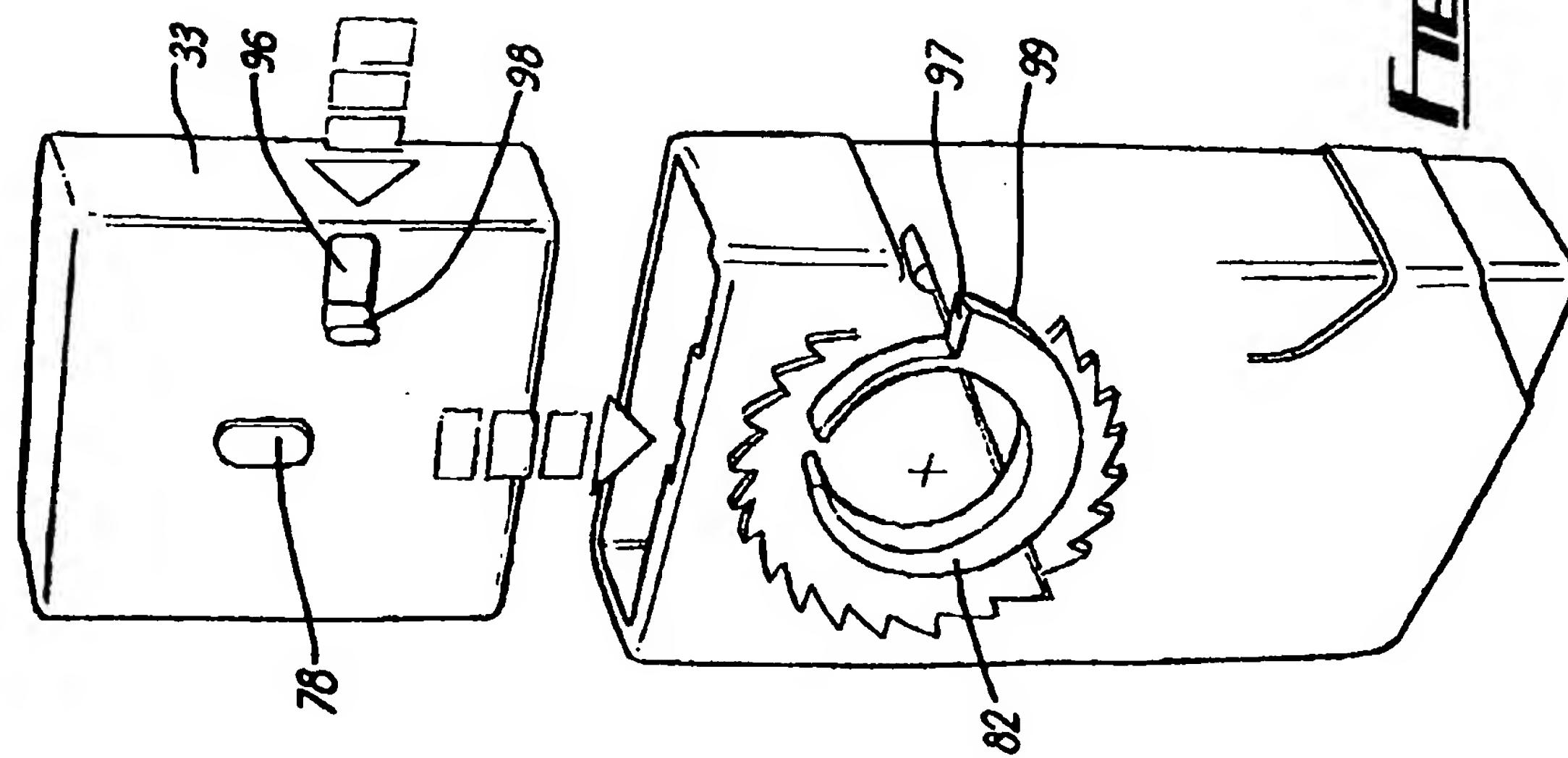
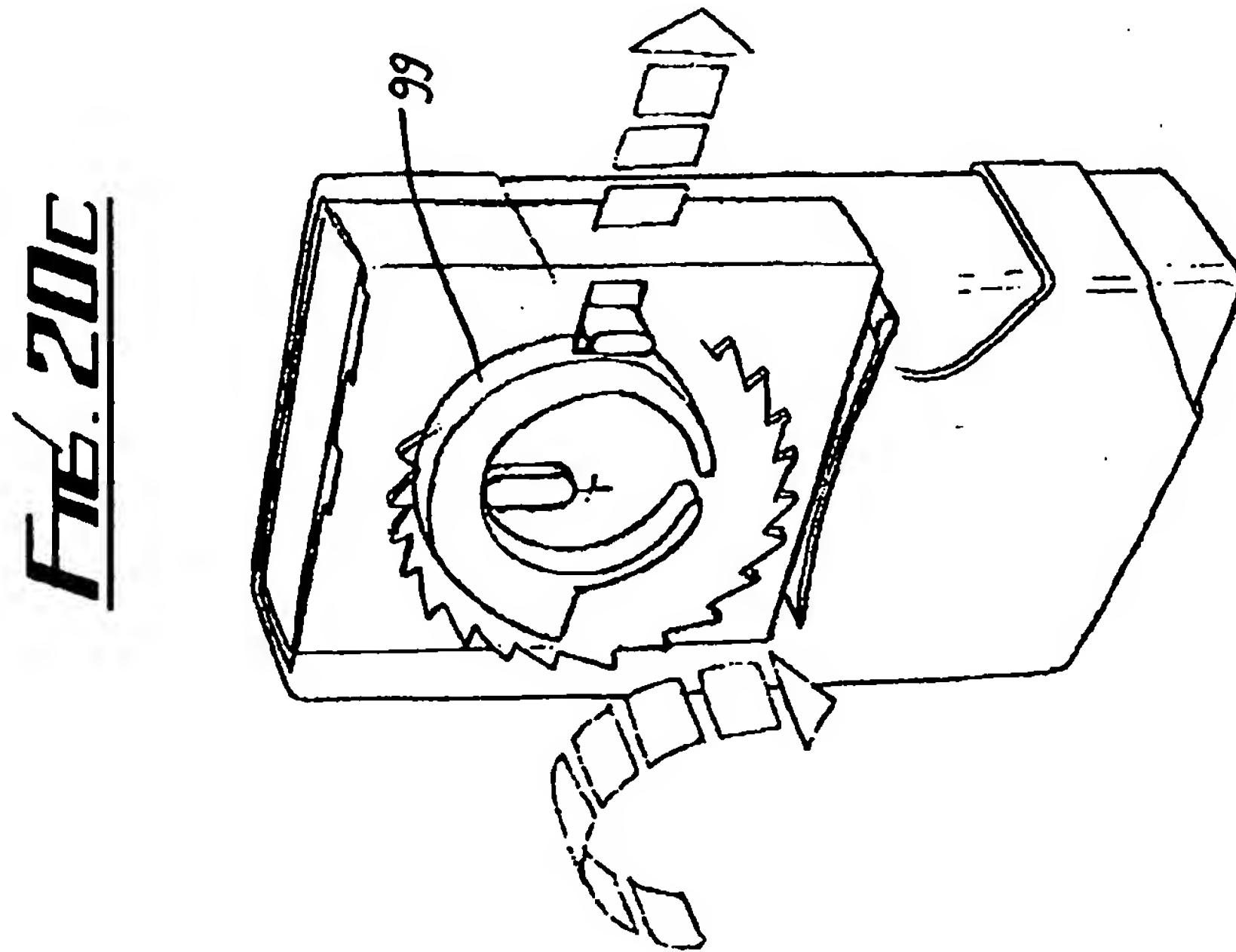
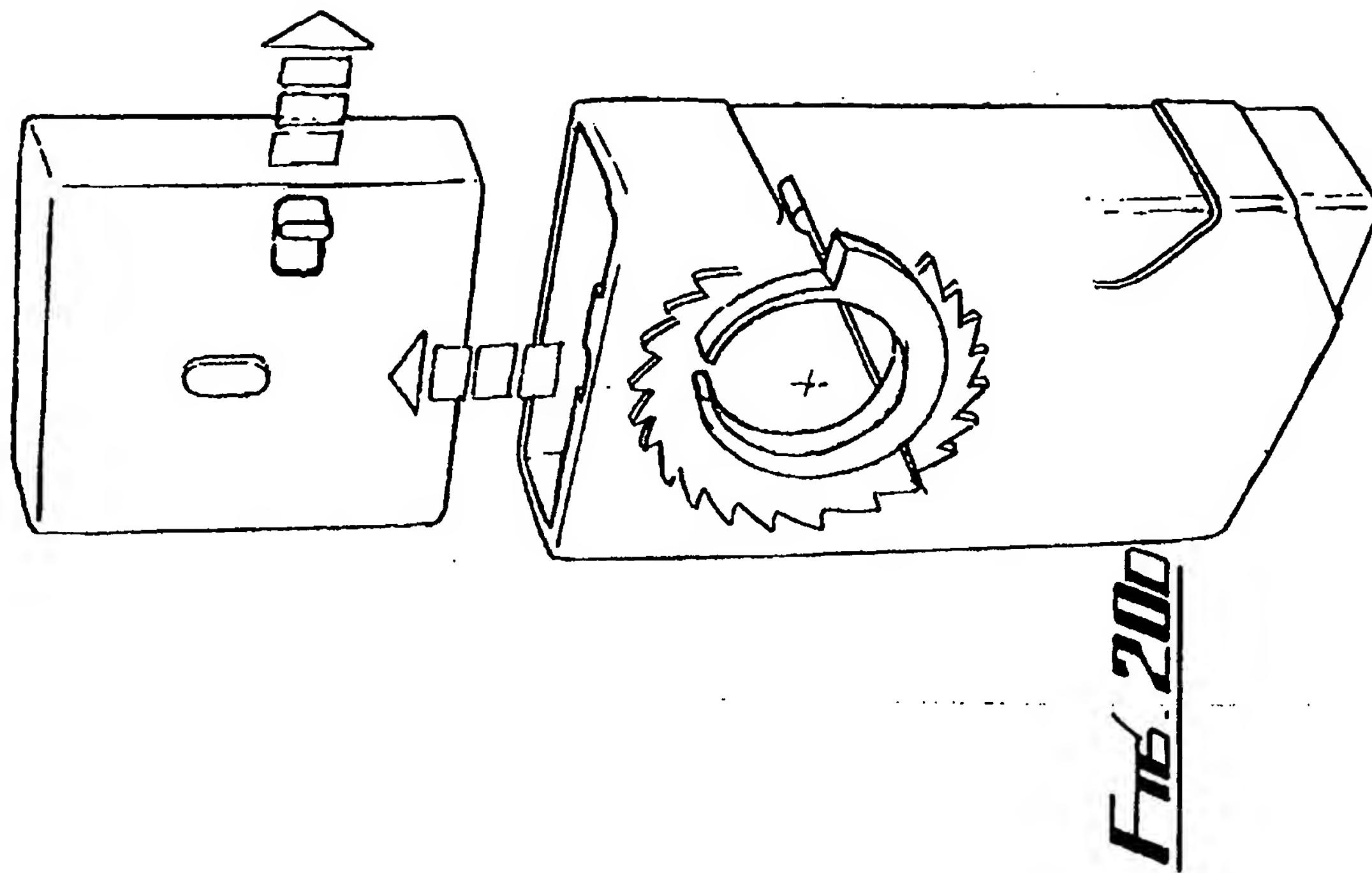


FIG. 20A





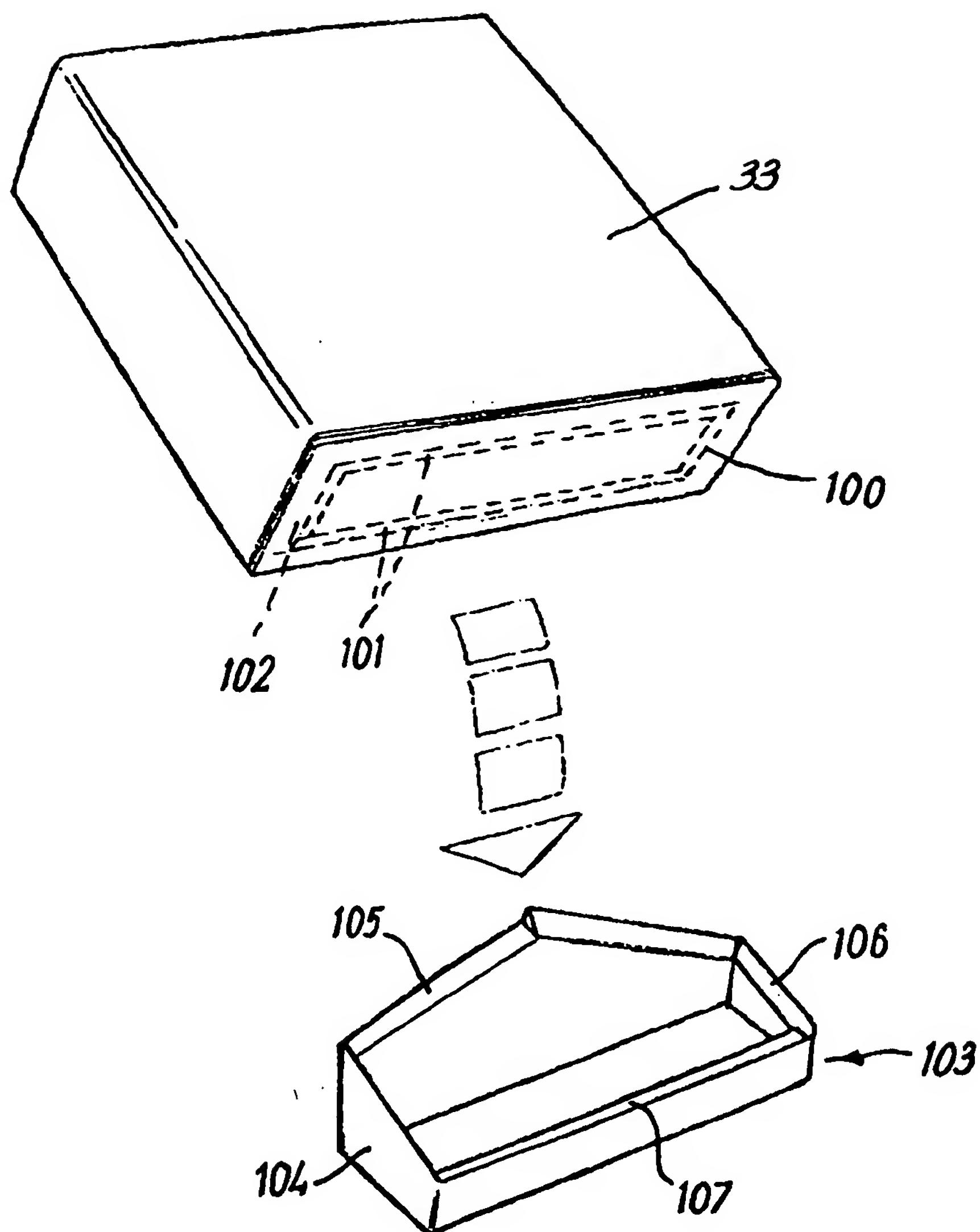
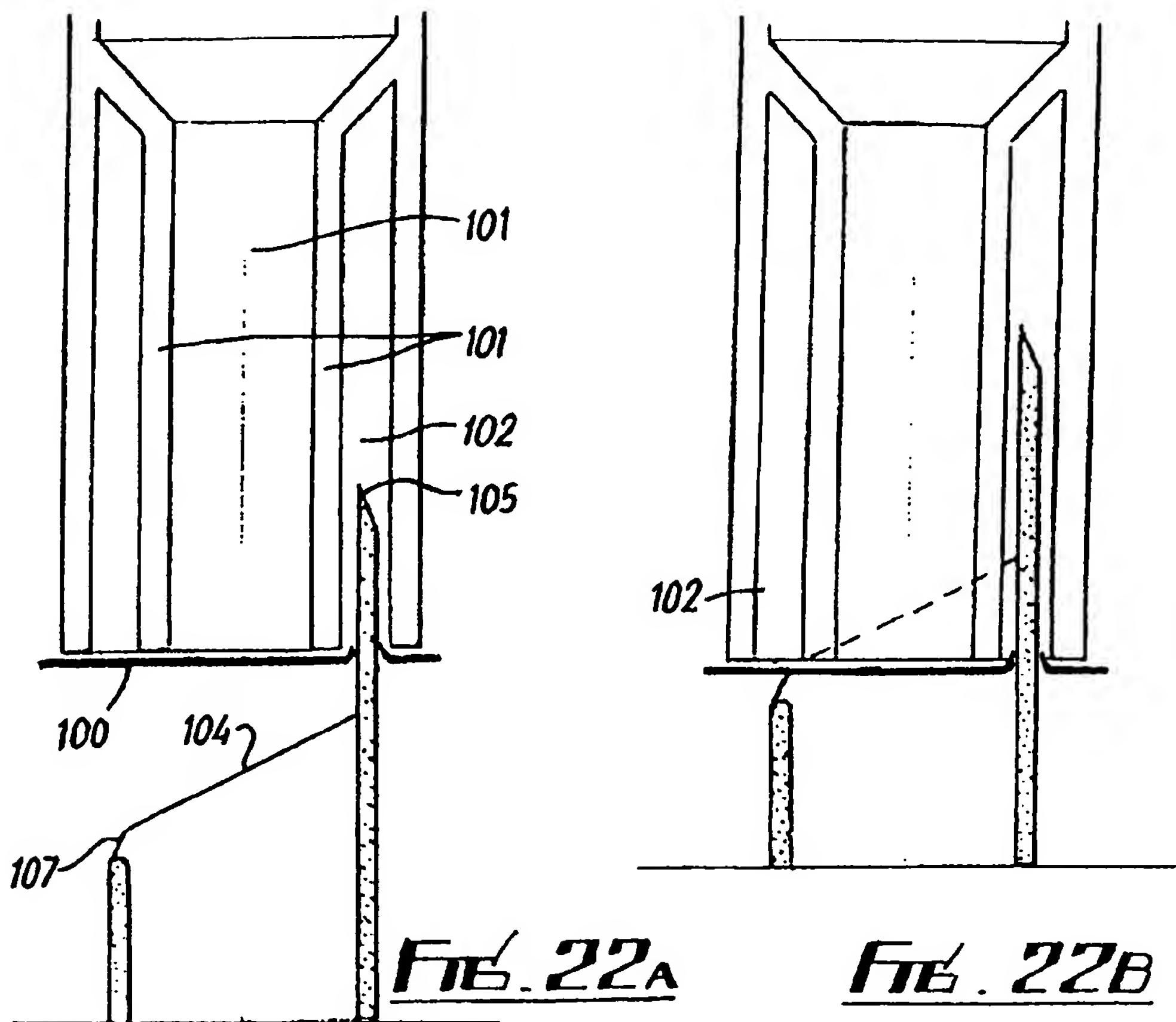


FIG. 21



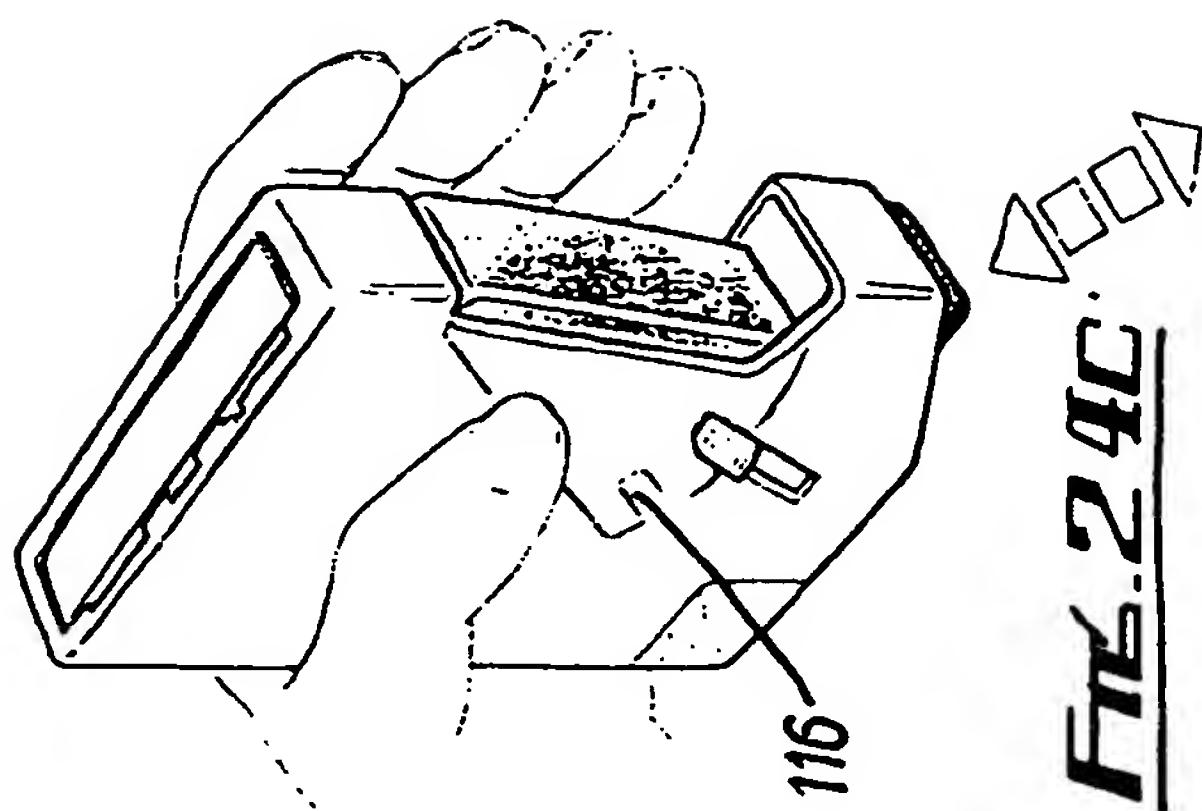


Fig. 24C.

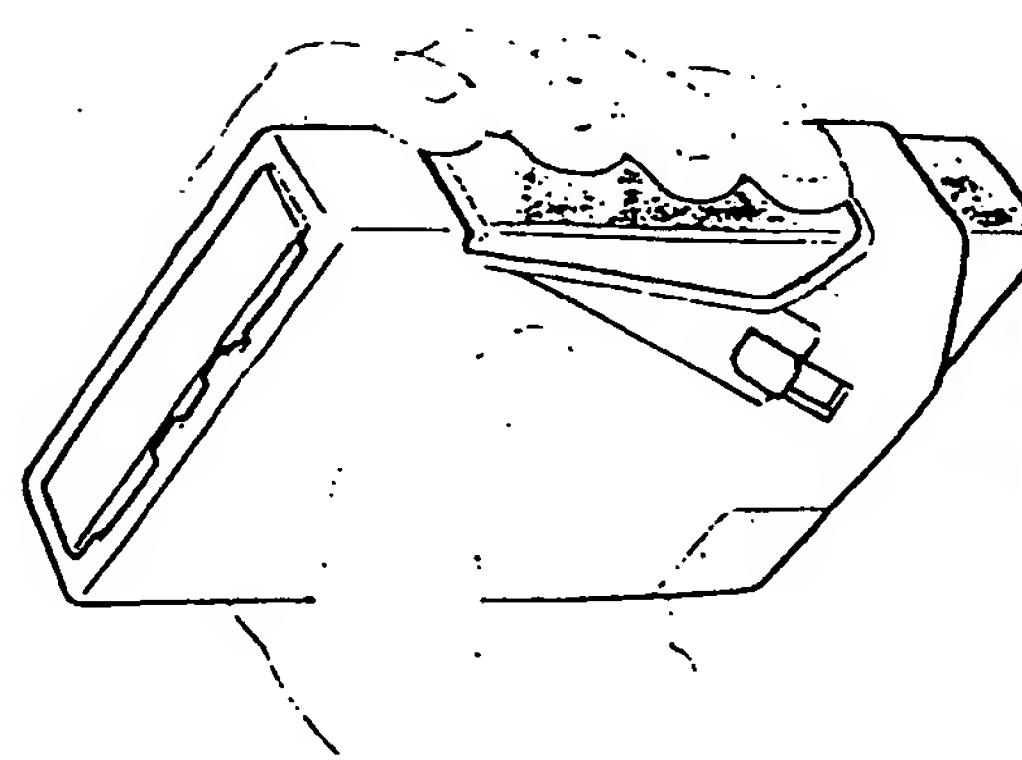


Fig. 24B

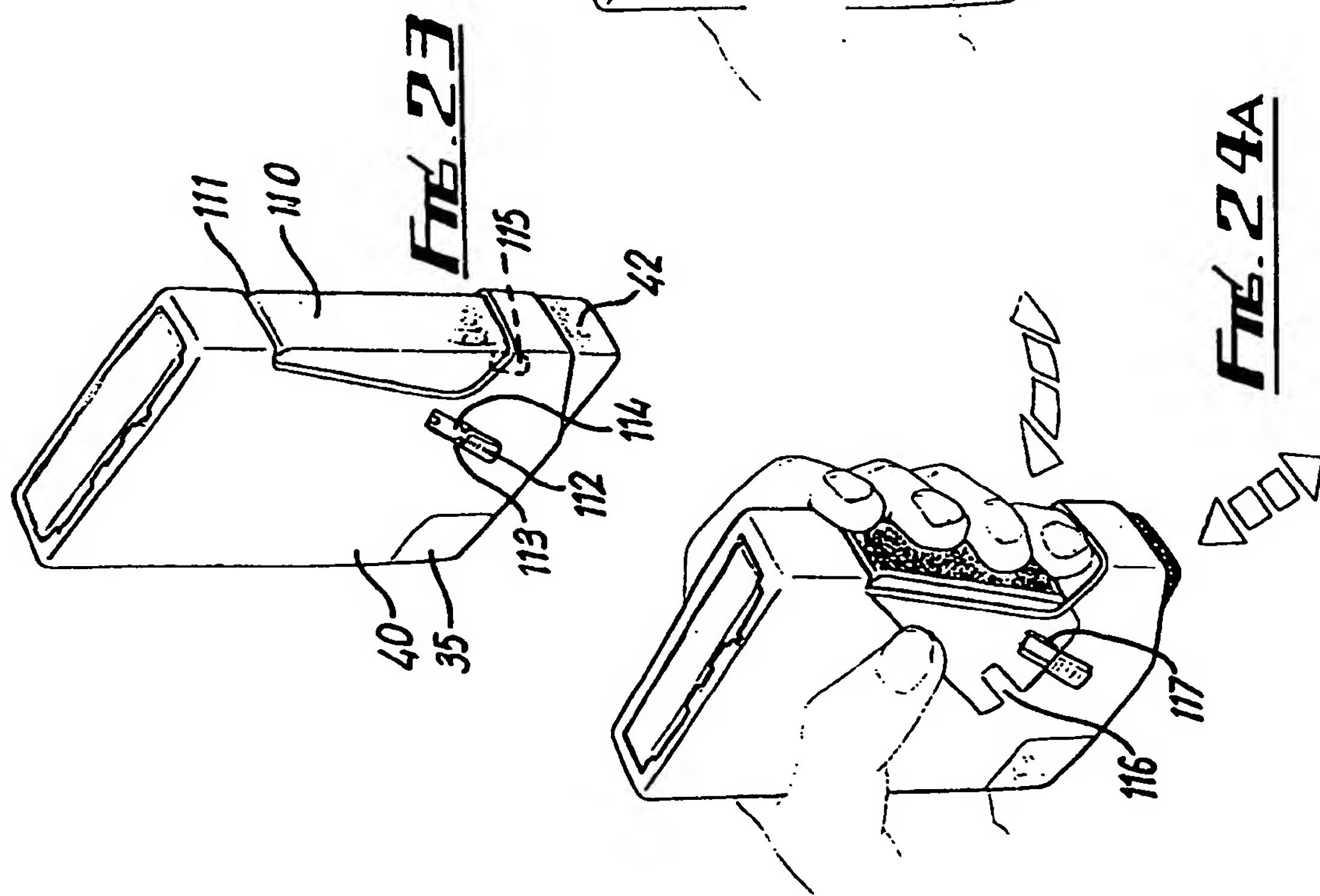
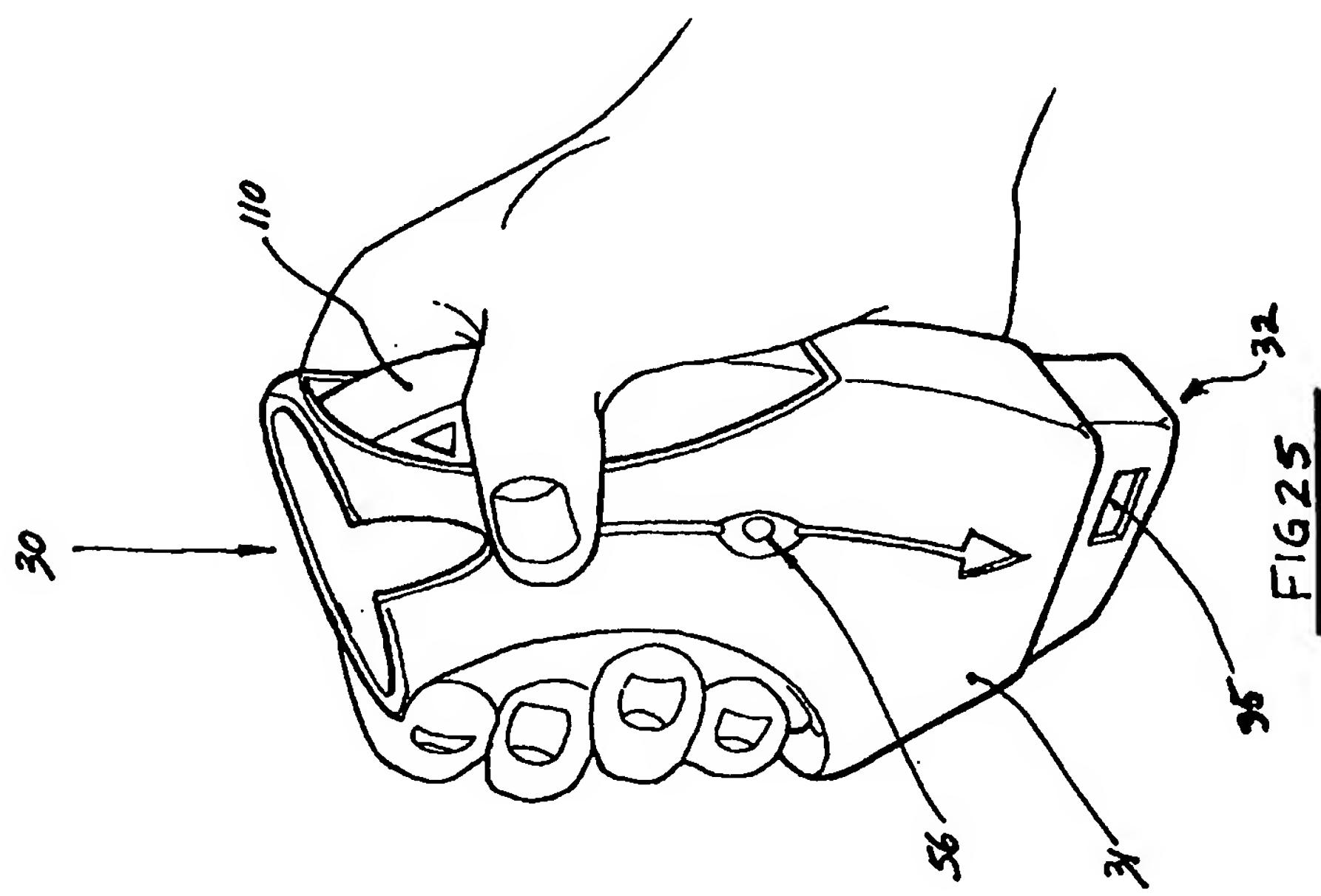
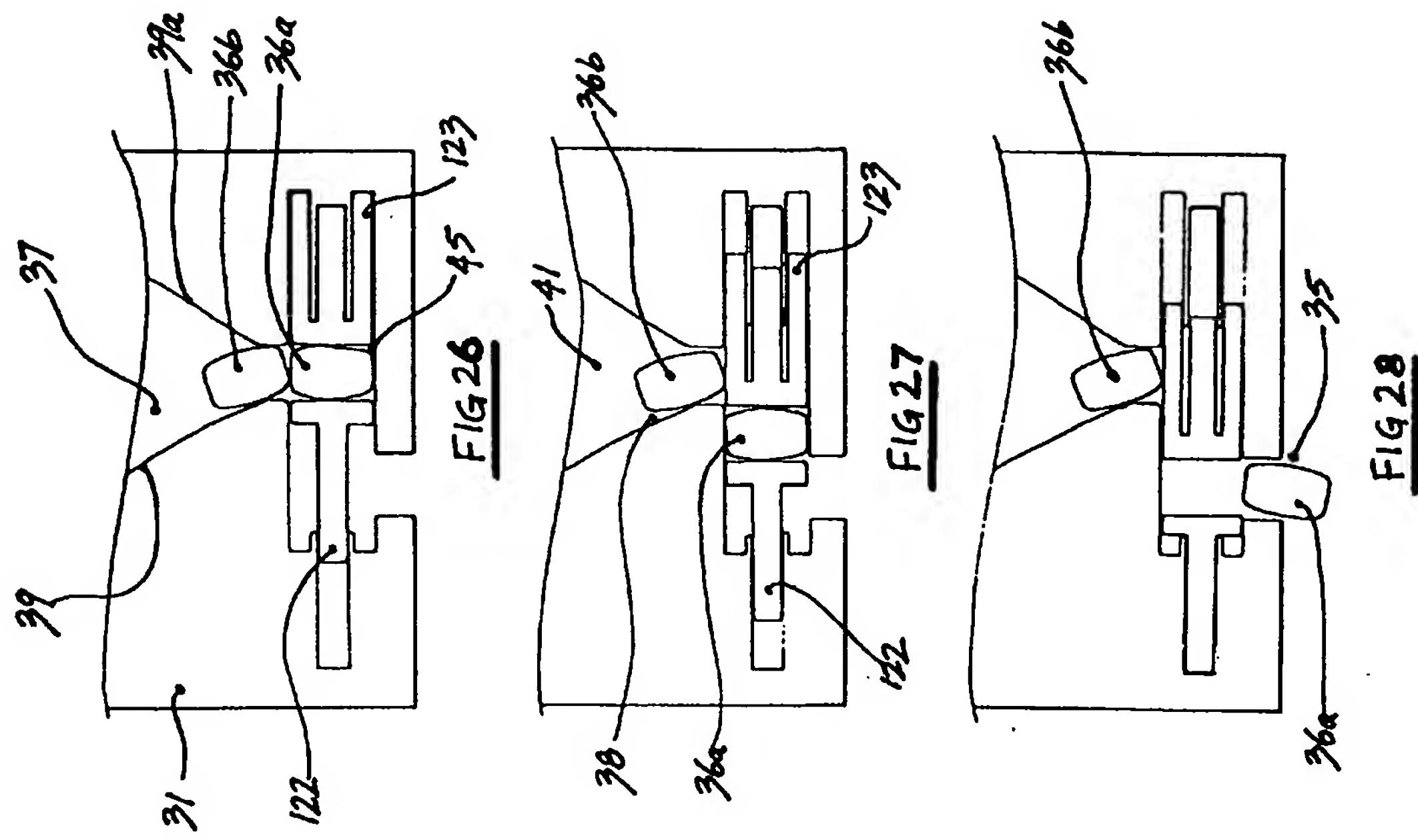
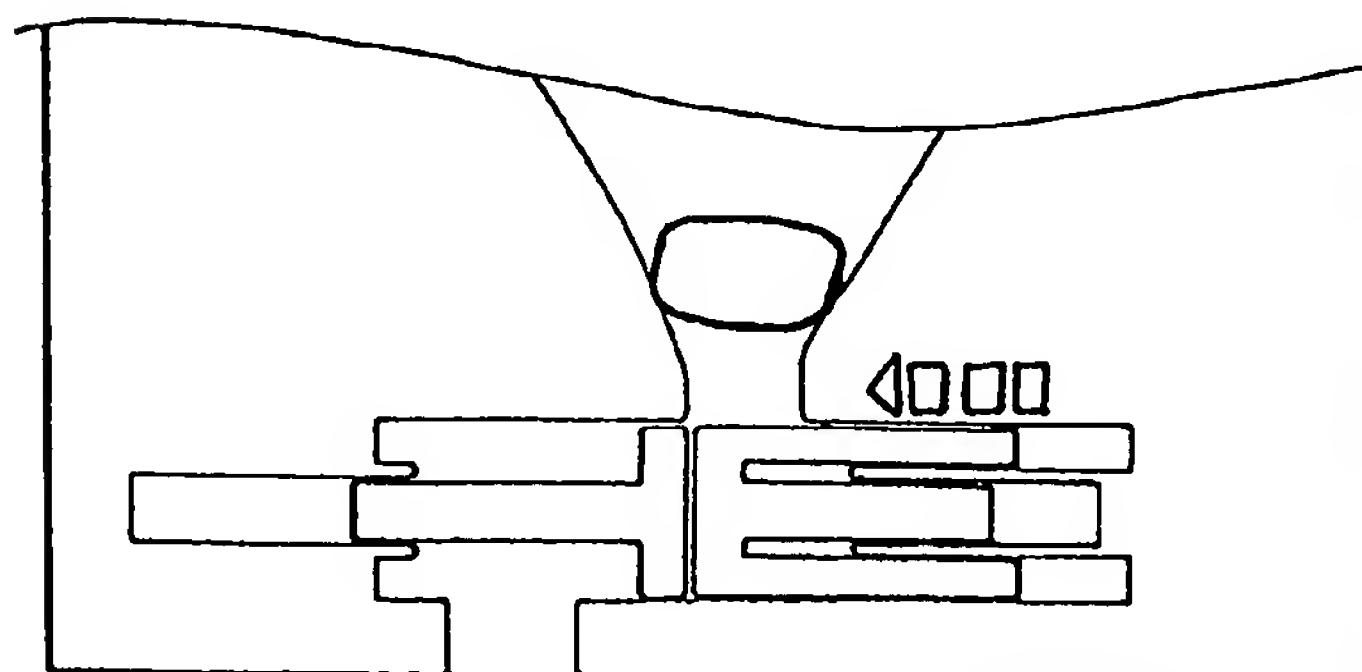
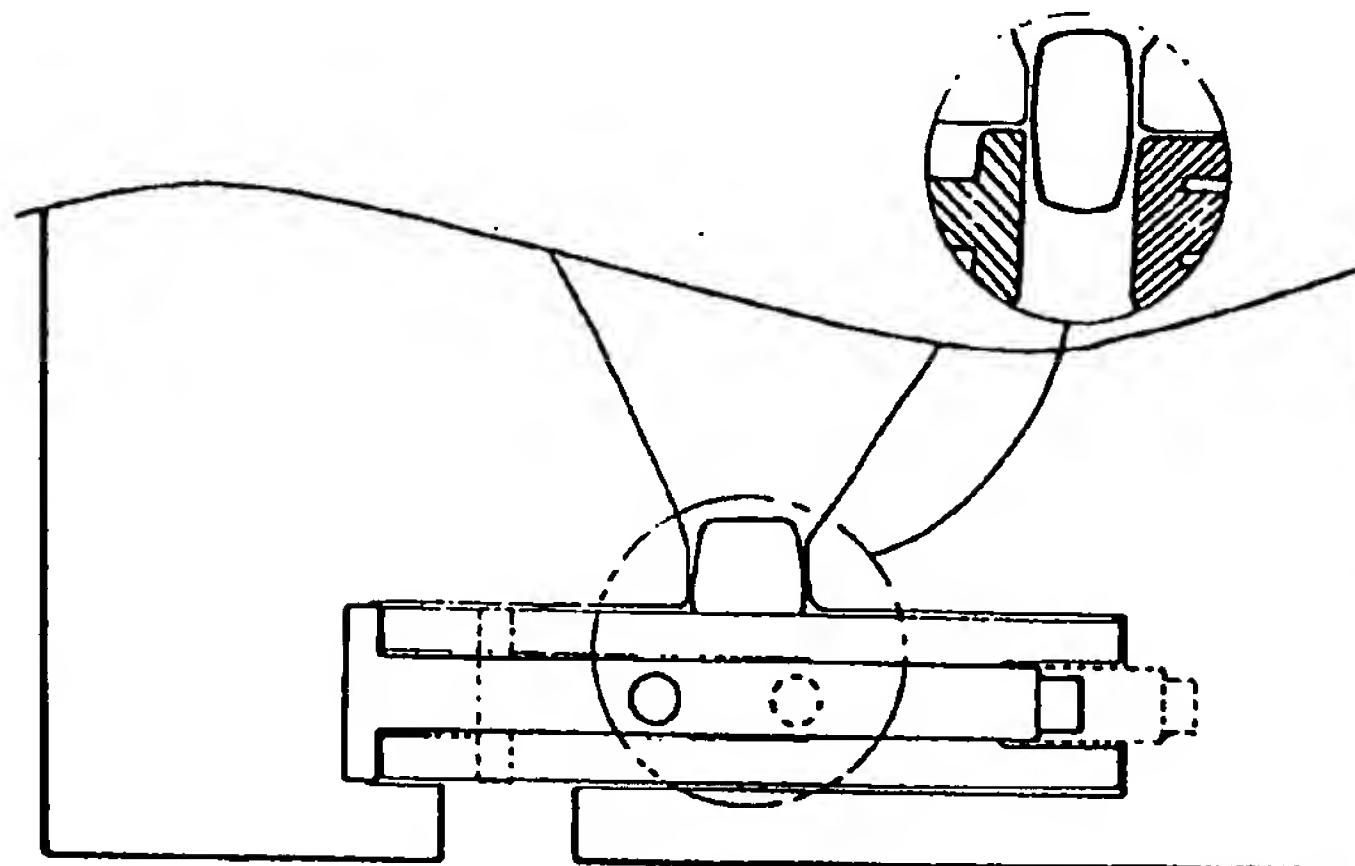
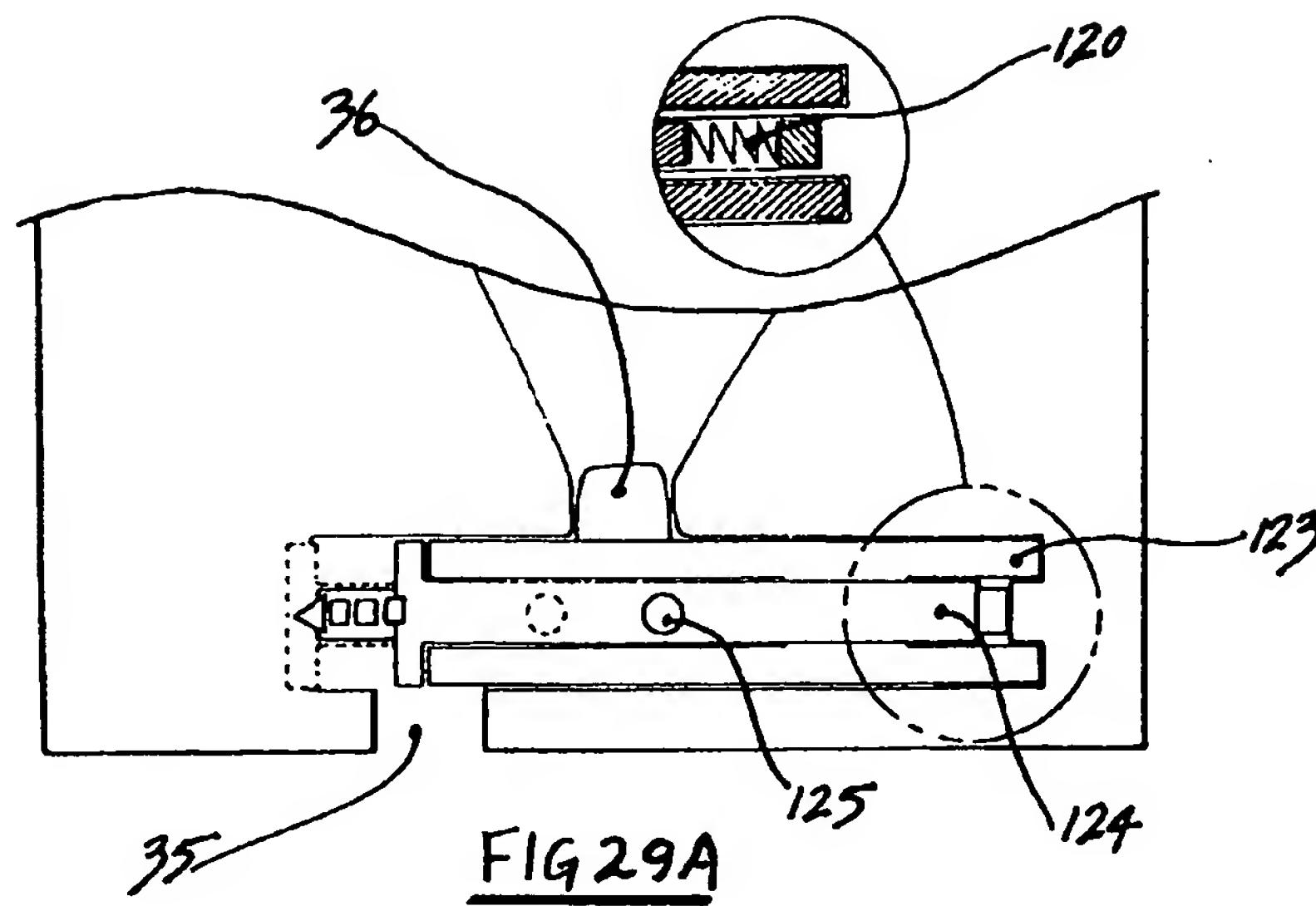
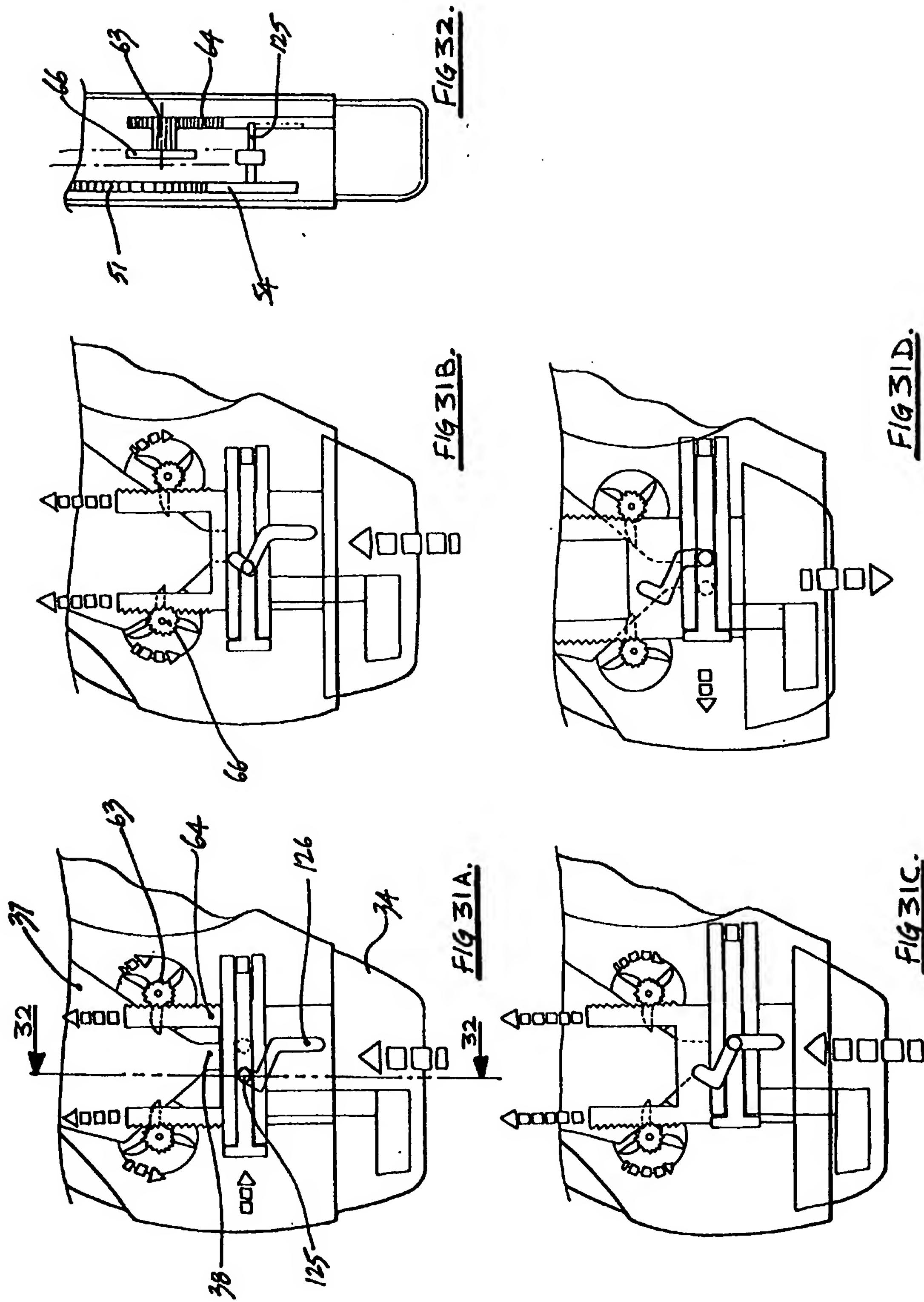


Fig. 24A







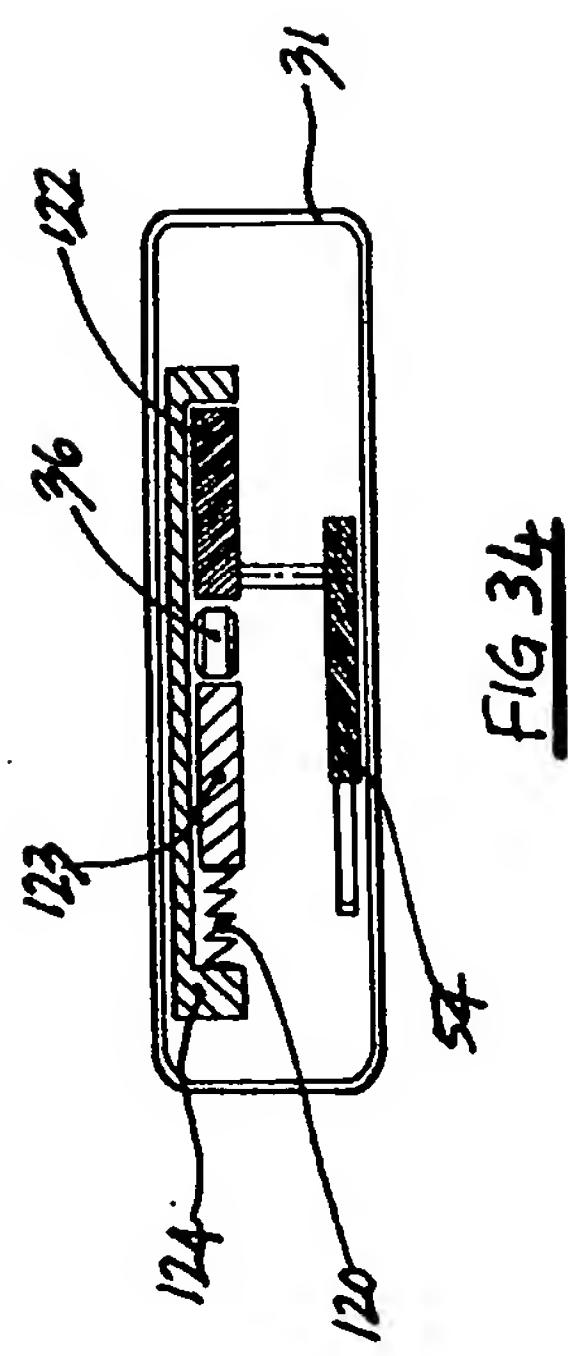


FIG 34

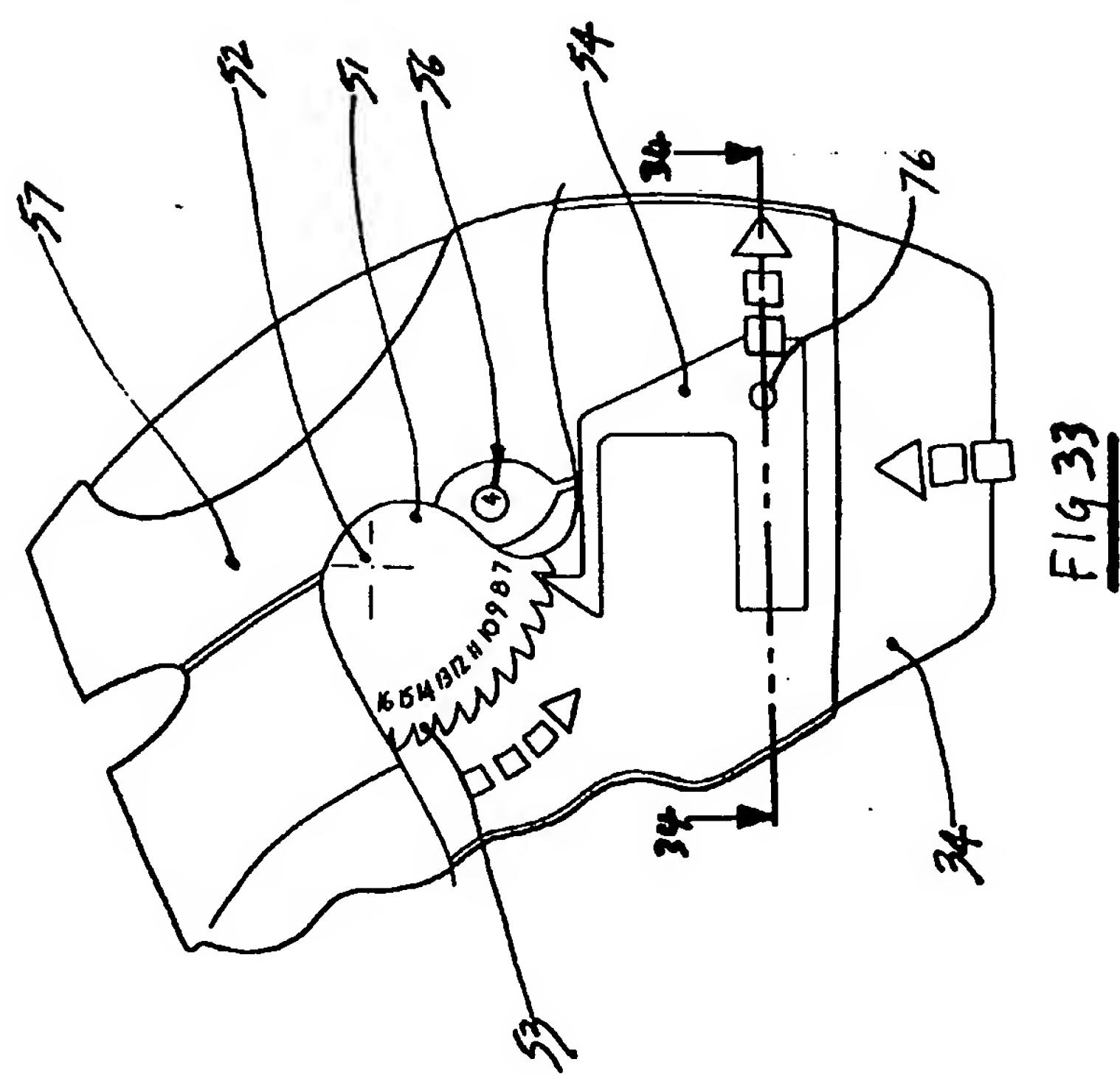


FIG 33

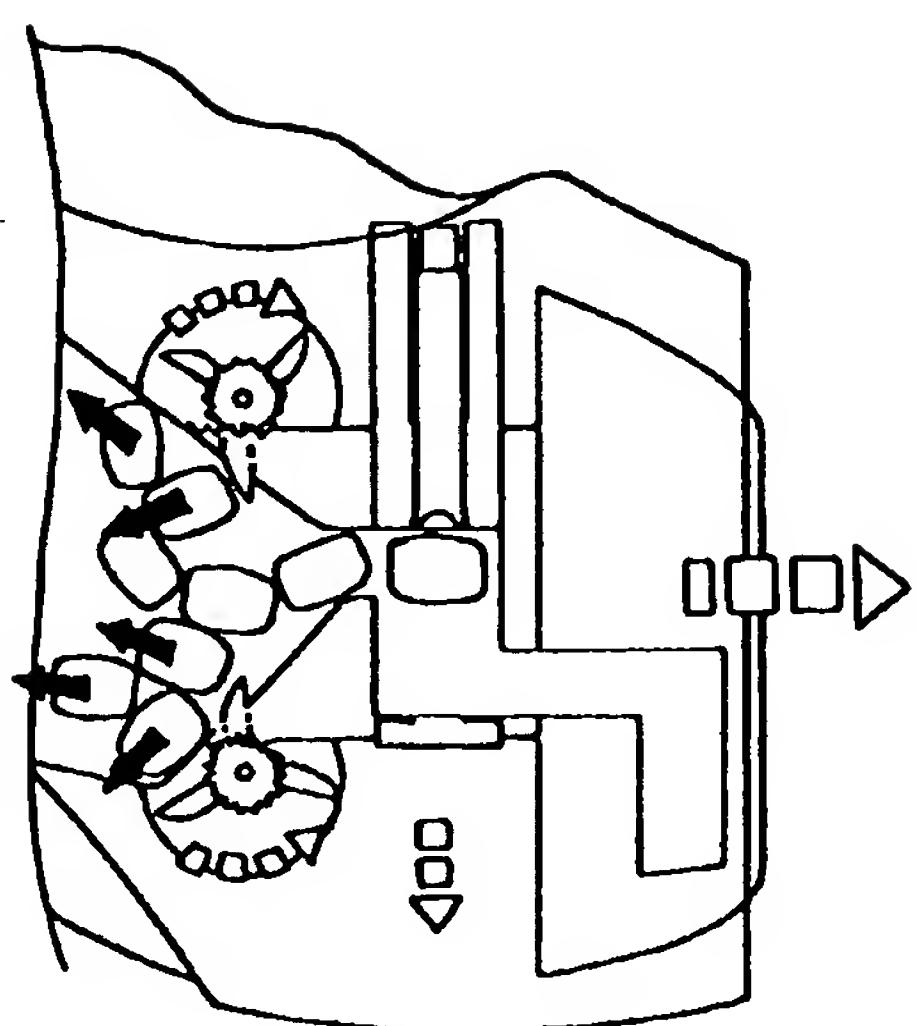


FIG 37.

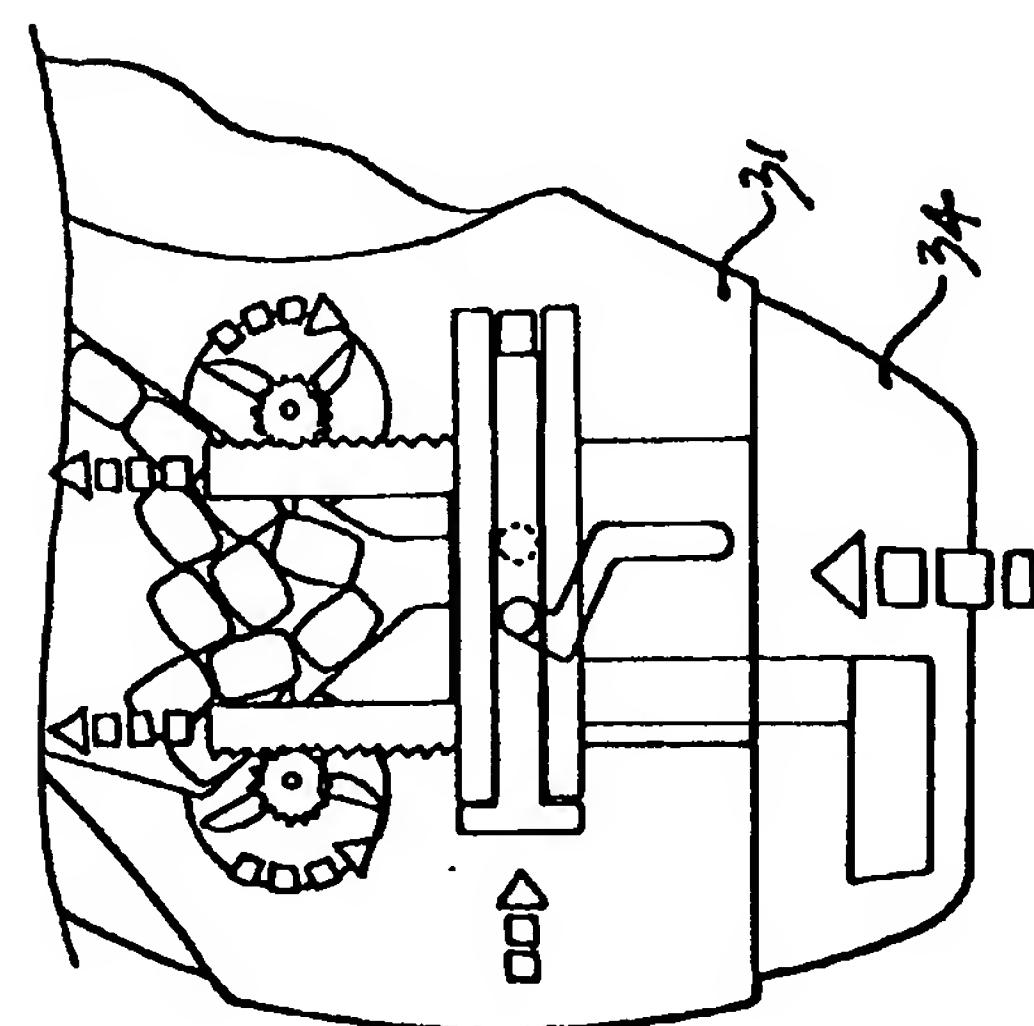


FIG 36.

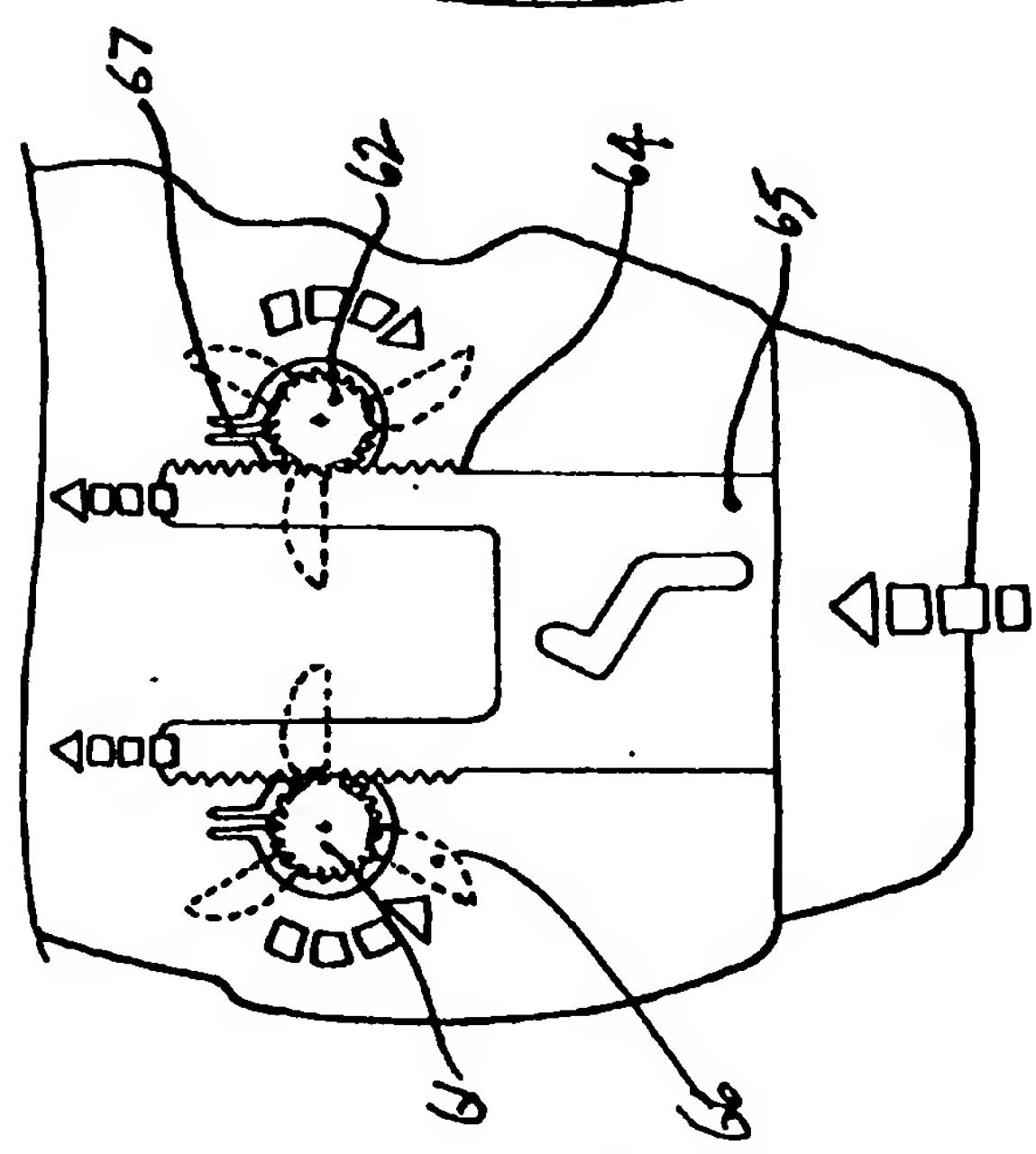


FIG 35.

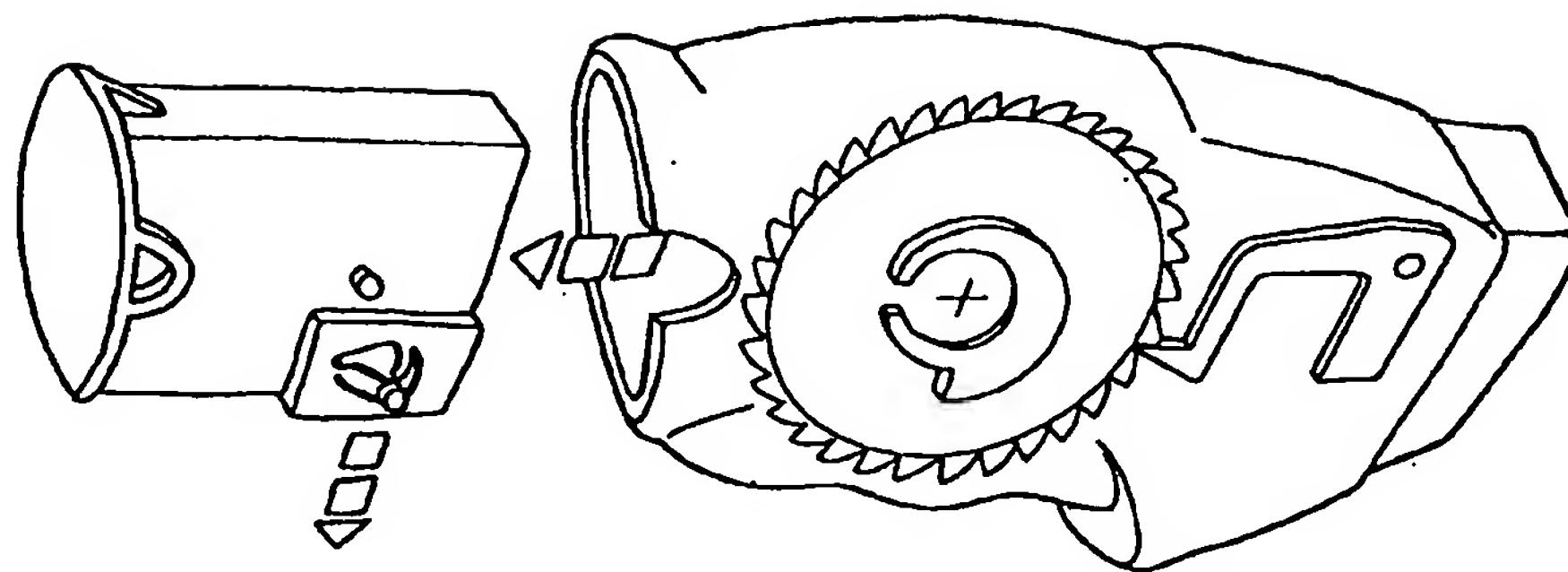


FIG 38 D

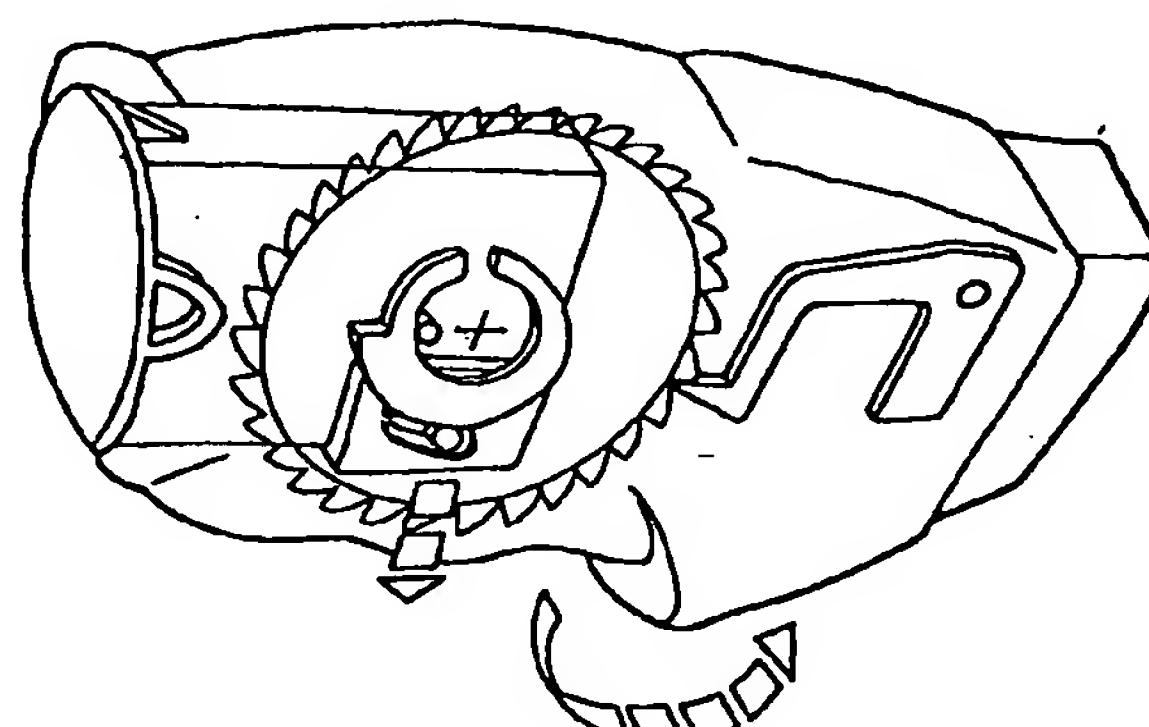


FIG 38 C.

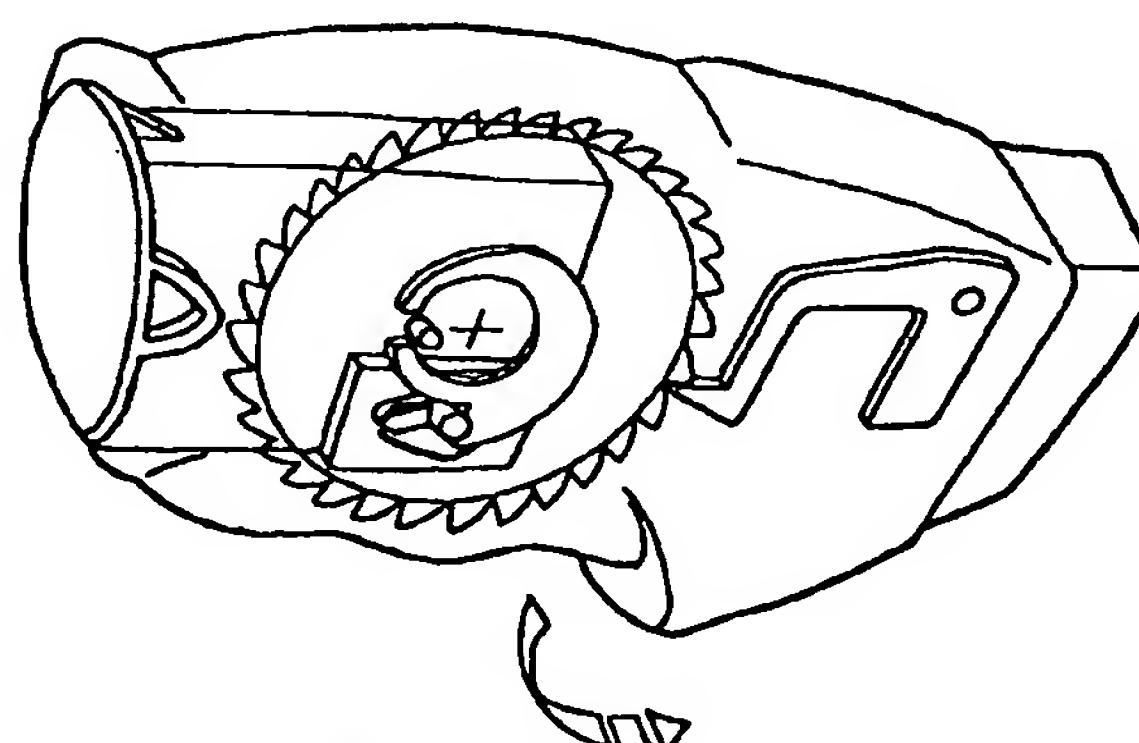
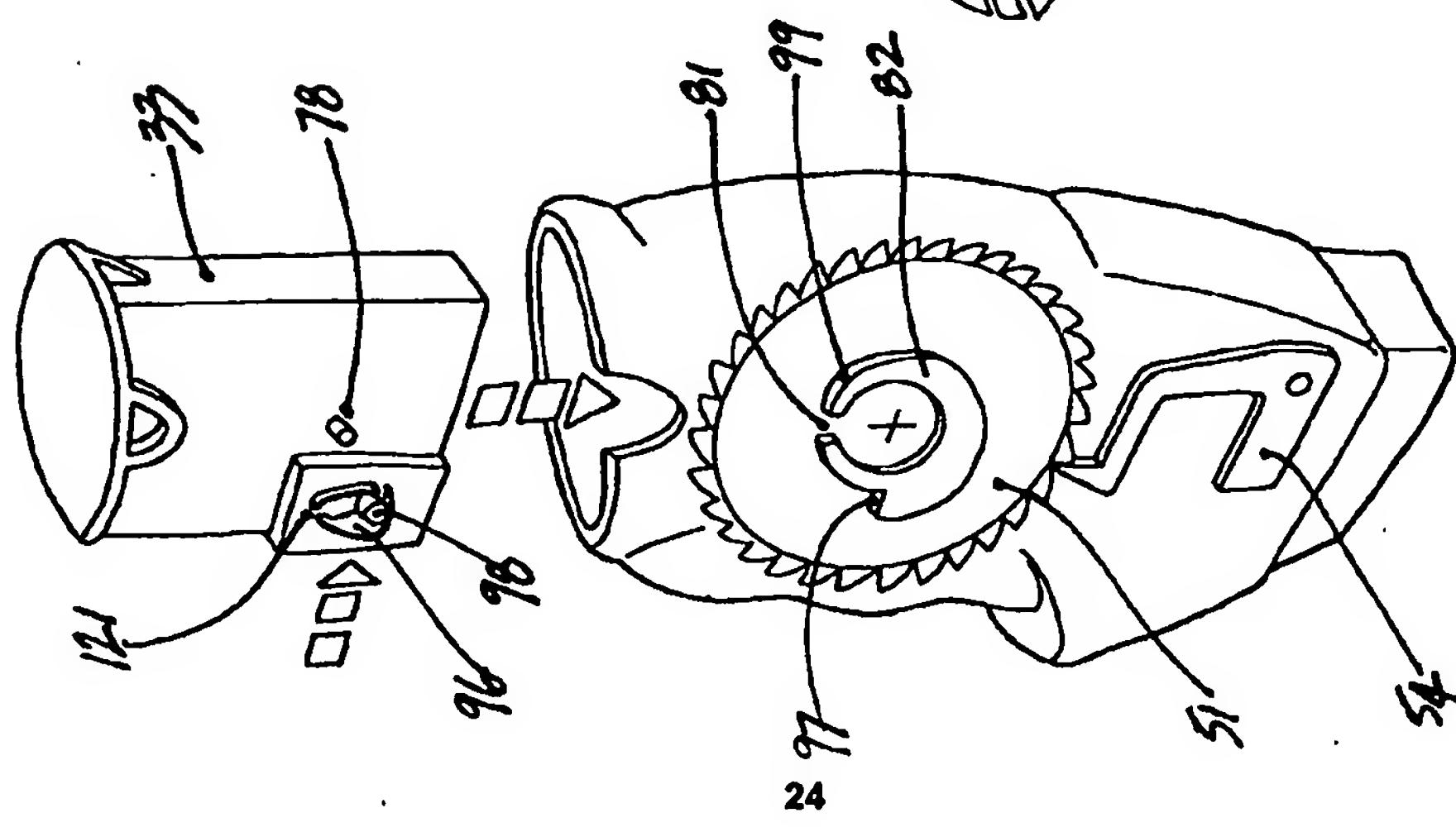


FIG 38 B.



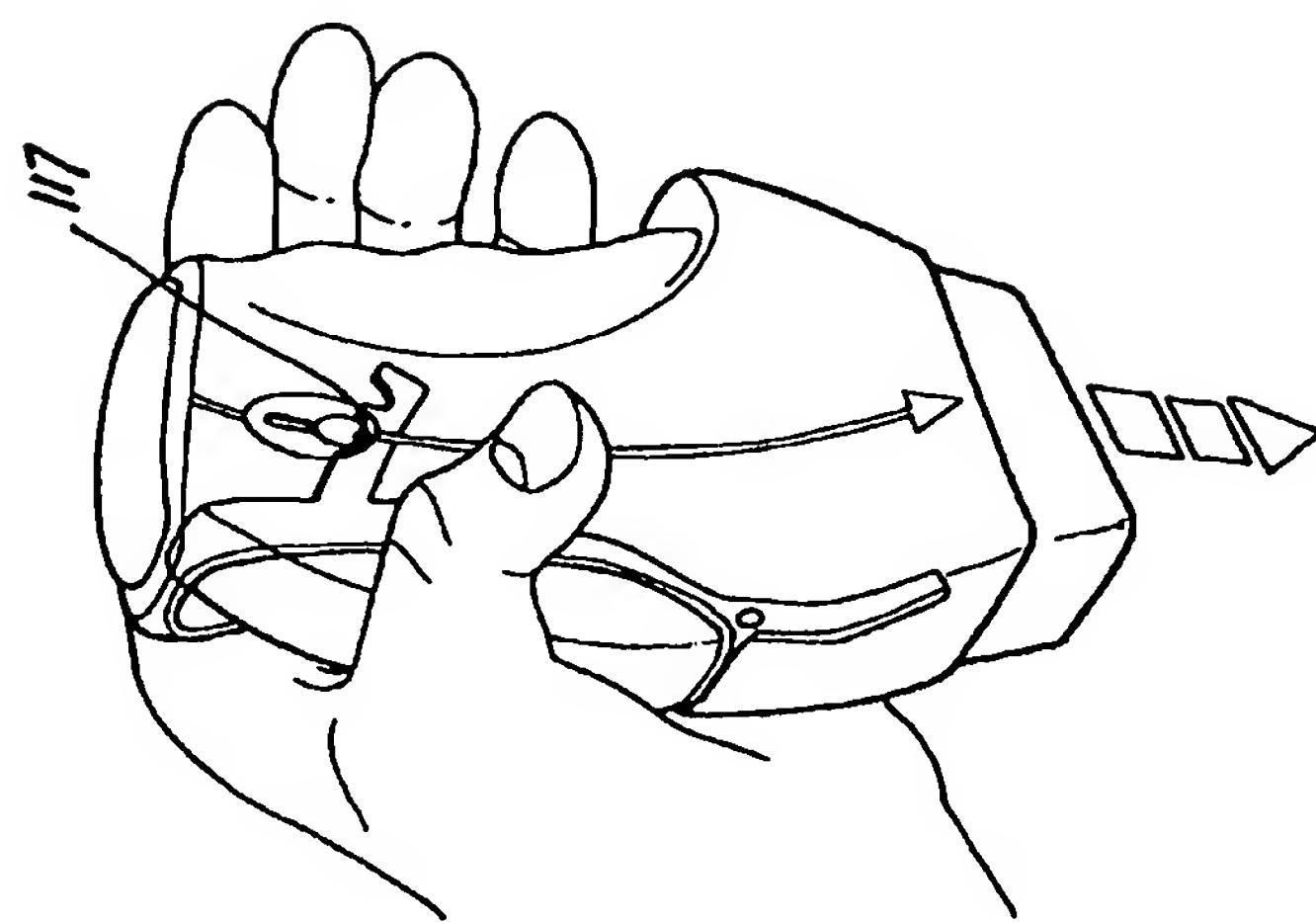


Fig 40C

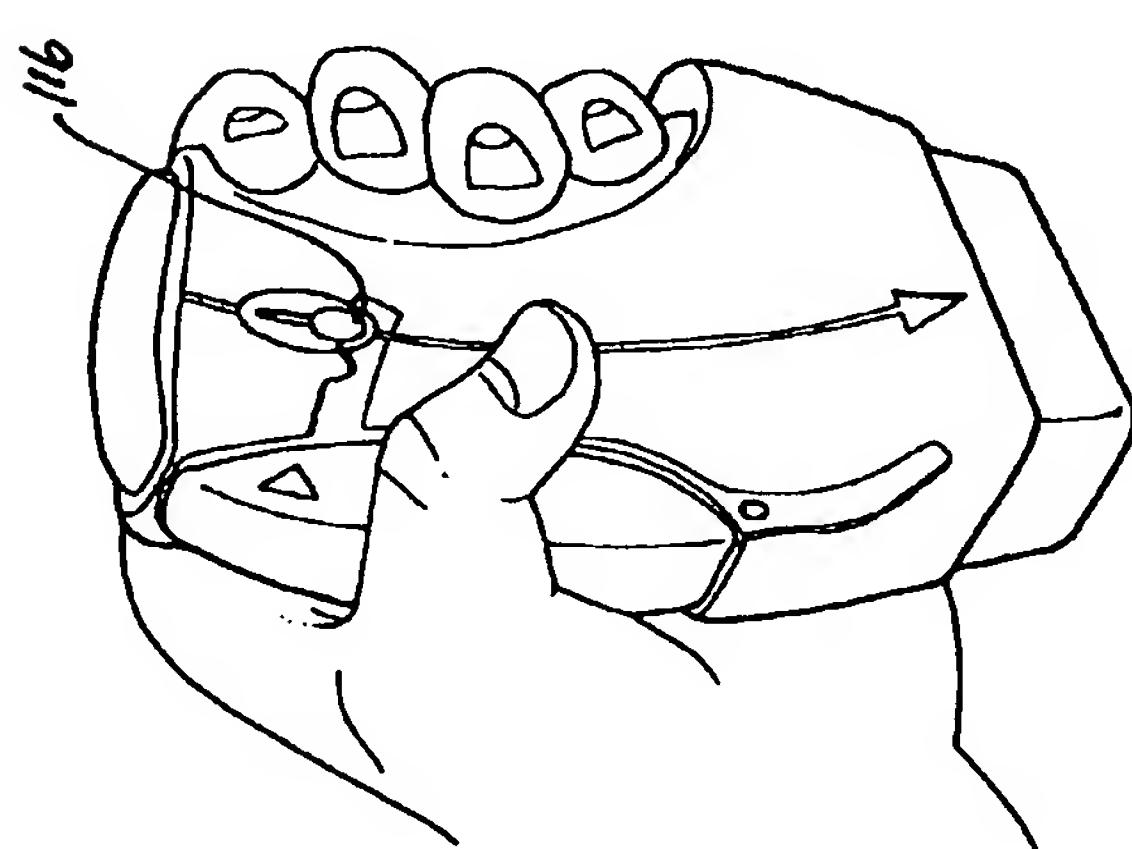


Fig 40B.

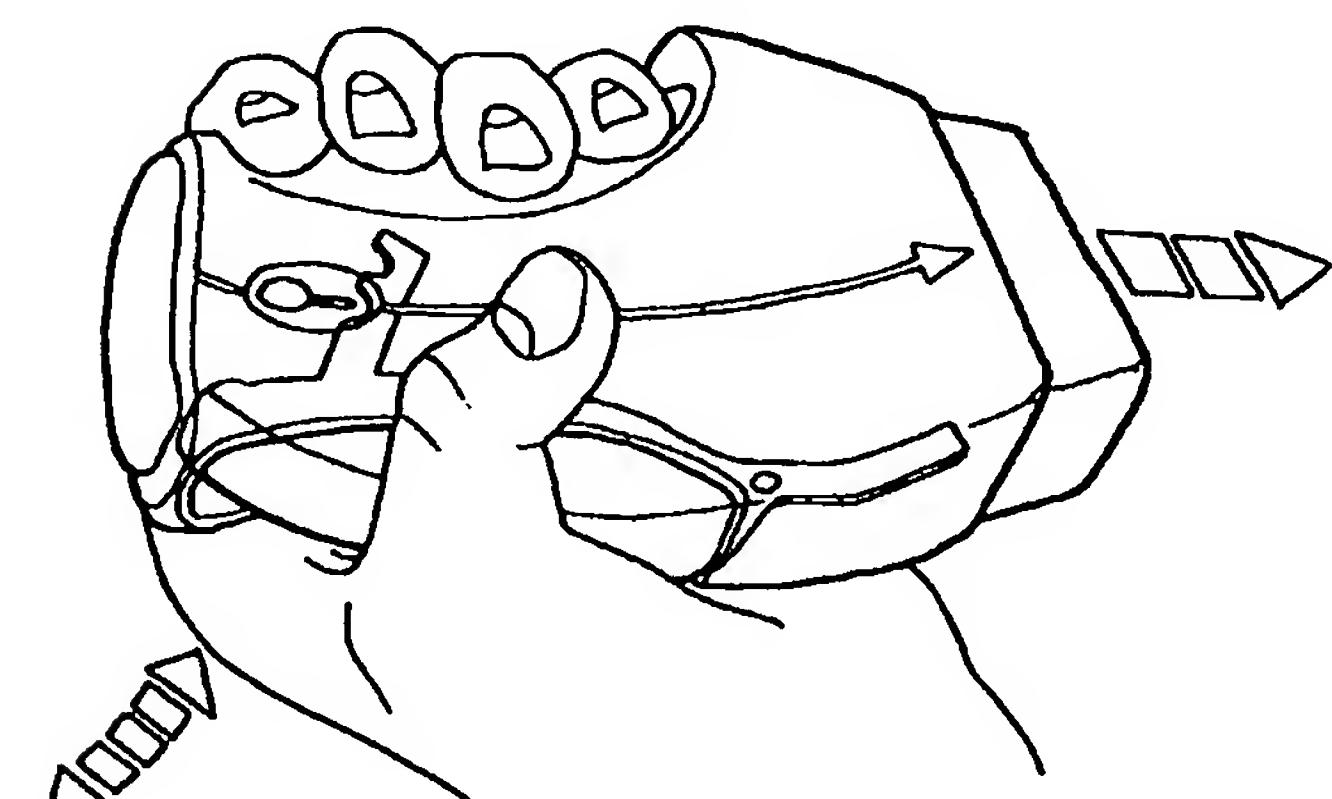


Fig 40A.

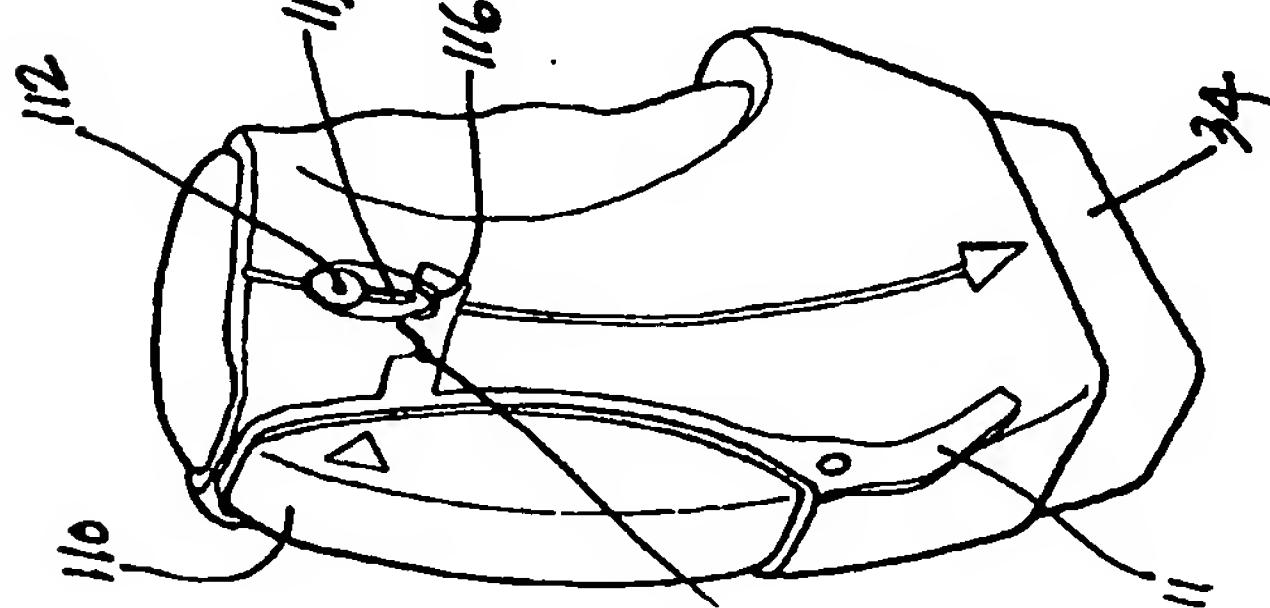


Fig 39



European Patent Office

EUROPEAN SEARCH REPORT

Application Number

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|--|---|-------------------|---|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.) |
| A | FR-A-712 676 (ETABLISSEMENTS NYTS FRERES) * the whole document * --- | 1 | B65D83/04 A61J7/02 |
| A | US-A-3 828 972 (LOUIS BENDER) * column 4, line 10 - column 6, line 61; figure 2 * | 1 | |
| A | GB-A-2 013 636 (THE BOOTS COMPANY LIMITED) ----- | | |
| TECHNICAL FIELDS SEARCHED (Int.Cl.) | | | |
| B65D A61J G06M | | | |
| The present search report has been drawn up for all claims | | | |
| Place of search | Date of completion of the search | Examiner | |
| BERLIN | 8 September 1994 | Deprun, M | |
| CATEGORY OF CITED DOCUMENTS | | | |
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